



USER MANUAL

GNSS EQUIPMENT

NGR-3000




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- Please keep the manual for your future reference.

Modify Record

No.	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2017/06/14		01	First edition
2	Q/A	2017/08/15		02	Add navigation function
3	Q/A	2017/09/29		03	General modification
4	Q/A	2019/03/31	All	04	Software upgrade
5	Q/A	2021/07/16	All	05	Software upgrade
6	Q/A	2022/06/13	All	06	Software upgrade
7	Q/A	2022/08/04	2, 5, Appendix	07	Add DGNSS functions
8	Q/A	2023/02/21	All	08	General modification
9	Q/A	2024/03/28	1, Appendix	09	Some modification
10	Q/A	2024/08/20	1, Appendix	10	Some modification
11	Q/A	2024/12/03	1, 2.3, 5.4, 6.3, 6.4, Appendix	11	Some modification
12	Q/A	2025/09/22	All	12	General modification

SAFETY INSTRUCTIONS FOR THE OPERATOR

	<p>Warning Keep away from heat source or direct sunshine.</p>
	<p>Prohibition Don't open the equipment. Only qualified personnel should work inside the equipment. Don't disassemble or try to modify the equipment.</p>
	<p>Dangerous Turn off the power immediately when smoke or fire is emitted.</p>

SAFETY INSTRUCTIONS FOR THE INSTALLER




	<p>Warning Connect the earthing cord to ship's body. Observe the compass safe distance to prevent deviation of an onboard magnetic compass.</p>
	<p>Prohibited Don't open the equipment unless you have fully understood the structure and circuits of the equipment. Only qualified personnel should work inside the equipment. Don't disassemble or try to modify the equipment.</p>
	<p>Dangerous Turn off the power at power distribution board before installation.</p>

TABLE OF CONTENTS

1. PRODUCT FEATURES	1
2. OPERATIONAL OVERVIEW.....	2
2.1 Control Description	2
2.2 Power ON/OFF	3
2.3 Adjust Dimmer	3
2.4 Basic Menu Operation	3
2.5 How to Enter Character Data	4
2.6 Display Modes	5
2.6.1 <i>Data display</i>	5
2.6.2 <i>Plotter display</i>	6
2.6.3 <i>Highway display</i>	8
2.6.4 <i>Compass display</i>	8
2.6.5 <i>Satellite display</i>	9
2.6.6 <i>Beacon display</i>	9
3. NAVIGATION PLANNING.....	11
3.1 Register Waypoints	11
3.1.1 <i>Insert a new waypoint</i>	12
3.1.2 <i>Edit a waypoint</i>	12
3.1.3 <i>Delete a waypoint</i>	13
3.2 Route Planning	14
3.2.1 <i>Edit a route</i>	14
3.2.2 <i>Forward navigation</i>	15
3.2.3 <i>Reverse navigation</i>	15
3.2.4 <i>Create a new route</i>	15
3.2.5 <i>Delete a route</i>	16
3.3 Stop the Navigation by the Current Route	16
4. NAVIGATION ALARMS	17
4.1 XTE (Cross Track Error) Alarm	17
4.2 Speed Alarm	18
4.3 Arrival Alarm and Anchor Watch Alarm.....	18
4.4 Track Record	20
4.5 ETA-SOG.....	21
4.6 Notice Audio	21
5. MENU SETTING	22
5.1 GNSS Setting	22
5.1.1 <i>GNSS mode</i>	22
5.1.2 <i>Geodetic datum</i>	22

5.1.3 RAIM.....	23
5.1.4 Differential mode.....	24
5.1.5 Smoothing.....	27
5.2 System Setting	27
5.2.1 Key buzzer.....	27
5.2.2 LCD/KEY dimmer	27
5.2.3 Day/Night.....	28
5.2.4 Offset & Time zone.....	29
5.2.5 Unit.....	29
5.3 Alert	29
5.4 Diagnostics	31
5.4.1 Program version	31
5.4.2 LCD test.....	32
5.4.3 Factory test.....	32
5.4.4 Factory default.....	32
5.4.5 GNSS monitoring.....	33
6. INSTALLATION	34
6.1 Installation of Main Unit.....	34
6.2 Installation of Antenna Unit	34
6.3 Cabling.....	34
6.3.1 Power connection	35
6.3.2 Interfaces.....	35
6.3.3 Alert interface.....	35
6.3.4 Grounding	36
6.4 Initial Settings	36
6.4.1 Language setting	36
6.4.2 Sentence setting.....	37
APPENDIX I MENU TREE.....	40
APPENDIX II TECHNICAL SPECIFICATIONS.....	41
APPENDIX III SENTENCE DESCRIPTION	43
APPENDIX IV INSTALLATION DRAWING	50

1. PRODUCT FEATURES

NGR-3000 is an IMO GNSS equipment of NSR' new generation, compatible with GPS, Beidou and Glonass systems.

NGR-3000 GNSS equipment consists of a display unit and an antenna unit.

The highly sensitive GNSS equipment tracks up to 50 satellites simultaneously. It ensures optimum accuracy in the determination of vessel position, course and speed.

The main features of NGR-3000 are:

- Comprehensive navigation data displays.
- Alerts: Loss of Position, loss of differential signal, HDOP Exceeded.
- Menu-driven operation.
- 7-inch, color LCD, touch screen operation with adjustable brightness.
- 3 GNSS data outputs, BAM/INS input/output.
- Possible to be upgraded to DGNSS.

The product meets the requirements of relevant IMO and IEC regulations & standards, including IMO MSC.112 (73), MSC.302 (87), IEC 61108-1, IEC 62923-1, IEC 62923-2, IEC 62288 etc.

EQUIPMENT LIST:

Scope of Supply					
No.	Name	Type	Q'ty	Part No.	Description
1	Main Unit	NGR-3000	1	N992530	N992531 with NDG-100
2	GNSS Antenna	NGA100	1		Cable length 10m or 20m
3	Installation Materials				
3.1	Antenna Mount Pole		1		
3.2	Steel Tie		2		
3.3	Accessories		1		
4	Options				
4.1	Beacon	NDG-100	1	N502561	Antenna
4.2	Flush Mount Bracket	NFB700A	1	N561070	
4.3	NMEA distributor	NND-100	1	N995710	
4.4	NMEA distributor	NND-200	1	N995720	







2. OPERATIONAL OVERVIEW

2.1 Control Description

The GNSS equipment can be operated by key & knob on panel or touch-screen.



When operating with knob, turn the knob to select an item on screen and press the knob to confirm the selection.

Panel Button	Description
	Turn to select an item. Press to confirm the selection or input.
	Power ON/OFF. To power OFF, press and hold this button more than 3 seconds.
	Press to change the LCD brightness.
Touch-screen Button	Description
	Enter to display different modes.
	Acknowledge current alert.
	Change day/night mode.

2.2 Power ON/OFF

- Turn on the power

Press the **PWR** button to turn on the power. Usually it will take about 45 seconds to find its position when turned on for the very first time.

- Turn off the power

Press and hold down the **PWR** button for 3s until the screen goes blank.

2.3 Adjust Dimmer

There are two ways to adjust the brightness of the LCD.

- Adjust the brightness in the [SYSTEM SETTING] by clicking [LCD/KEY DIMMER].

[SYSTEM SETTING]		RTCM
GN-P3D	31°26.9212' N 120°31.6598' E	UTC 2025-09-19 06:15:32
KEY BUZZER	OFF	
LCD/KEY DIMMER	Level_10	
DAY/NIGHT	DAY	
OFFSET & TIME ZONE		
UNIT	kn. nm	
←		
SET LCD/KEY DIMMER : 1 - 13		

- Press the **DIM** button to adjust the brightness.

Note:

When the power is turned off, the last status of brightness is stored. Therefore, when the power is turned on next time, the screen will display with the last brightness before powered off.

2.4 Basic Menu Operation

Most operations of your unit are carried out through the menu. If you get lost in operation, press the **PWR** button to return to the **MAIN** menu. Please refer to the complete MENU TREE in the Appendix.

DATA	ACK	DATA	RTCM SEAPACK	
	HDOP	RAIM	RAIM LEVEL	
PLOTTER	0.4	Safe	100m	
HIGHWAY	° 26.9212' N		TIME	2025-09-19 05:09:38 UTC
COMPASS	° 31.6599' E		LAST FIX	2025-09-19 05:09:38 UTC
SATELLITE	SOG		SATELLITE:	GPS: 09 GL0: 07 GAL: 11 BDS: 21
SETTINGS	6°	00.0 kn		
SOLUTION DATA				

- 1) Click **MENU** button on the main screen to display the modes and settings.
- 2) Turn the knob and press the knob to confirm the selection or click directly to select an item on screen.

2.5 How to Enter Character Data

In some instances, it is necessary to enter character data. The following example shows how to rename a route by soft keyboard.

TOTAL: 002 PAGE:1/1				[ROUTE LIST]	
GP- 3D	31°26.9213' N	120°31.6620' E	UTC	2022-05-13	08:50:29
ID	NAME	PTS	DISTANCE		
>> 2	ROUTE - NO.00002	4	15.9 nm	EDIT	
1	RTU001YHJKJHGVC	15	1033.8 nm	FORWARD	
				REVERSE	
				ADD	
				DELETE	
				Page ↓	
				Page ↑	
				←	

Operate the menus until the above screen appears. (Please refer to the related sections of WAYPOINT/ROUTE.)

TOTAL: 004 PAGE:1/1				[ROUTE - NO.00002]	
GP- 3D	31°26.9197' N	120°31.6617' E	UTC	2022-05-13	12:00:32
>> 020	31°29.376' N	120°27.973' E		ADD	
	POINT020	2022-05-13 08:22		RENAME	
021	31°31.929' N	120°31.267' E	47.7 °	DELETE	
	POINT021	2022-05-13 08:22	3.8 nm	Page ↓	
022	31°33.588' N	120°37.905' E	73.7 °		
	POINT022	2022-05-13 08:22	5.9 nm		
02	ABC				
	Q	W	E	R	T
	A	S	D	F	G
	Z	X	C	V	B

- 1) When the first line is selected, click **[EDIT]** to locate the first character to edit.
Click **[RENAME]** to rename the route desired.
- 2) Click the character among A-Z desired,
- 3) Click **[ABC]** to change to digit input, then click the desired number 0-9 .
- 4) Click **[✓]** to finish.

2.6 Display Modes

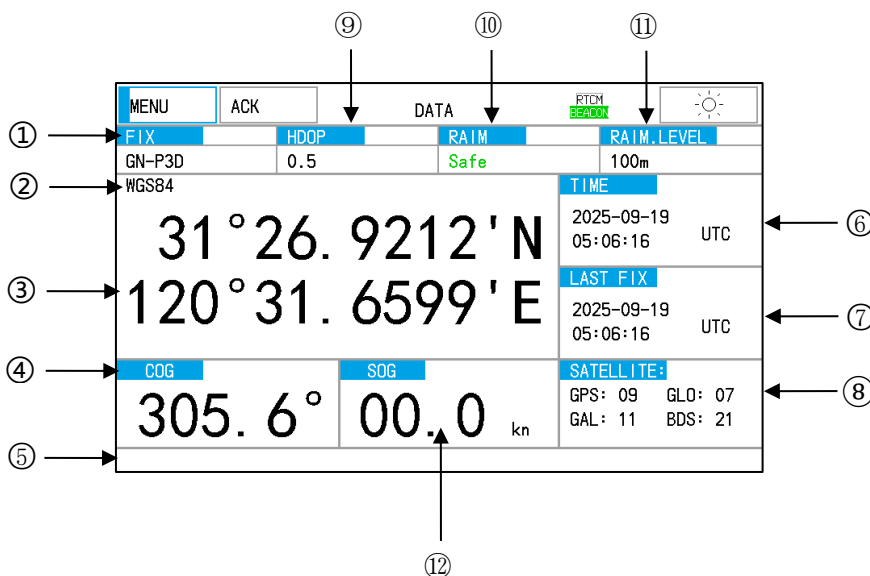
There are six display modes: Data, Plotter, Highway, Compass, Satellite and Beacon (which switches with the Satellite display). Click **[MENU]** button on the screen to select a display mode.

2.6.1 Data display

The **DATA** display is the default display mode of the equipment.

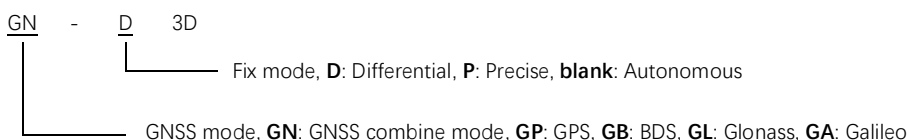
Basic data will be displayed in this mode, including position in latitude and longitude, course, speed, date and time.

NGR-3000 takes about 45 seconds to find the position when turned on for the very first time. Thereafter, it takes about 30 seconds to find the position each time the power is turned on. After fixing, the accurate position (in latitude and longitude) appears on the display. If the position could not be found, loss of position will appear in the alert column.



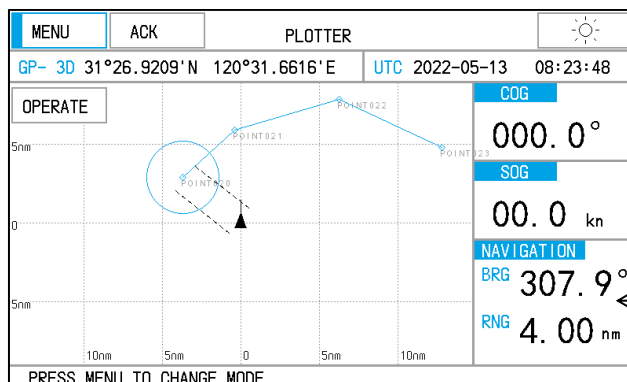
No.	Item	Symbol	Remark
①	Fix Mode	GP-D3D	See Note1
②	Datum	WGS84/PZ90	
③	Position in LAT & LON		
④	Course over Ground	COG	
⑤	Alert Column		Click to enter the alert list when alerts exist
⑥	Time	UTC/LMT	GNSS Time
⑦	Final Fixing Time	LAST FIX	
⑧	Quantity of Satellites Being Tracked	SATELLITE	
⑨	Horizontal Dilution of Precision	HDOP	
⑩	Receiver Autonomous Integrity Monitoring	RAIM	Safe/unsafe/caution/off
⑪	Accuracy Level for RAIM		10-100m
⑫	Speed over Ground	SOG	

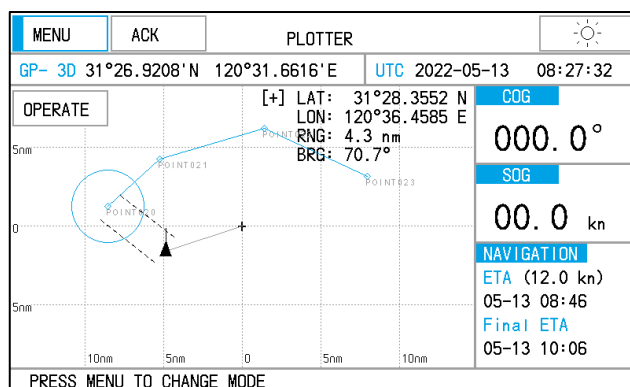
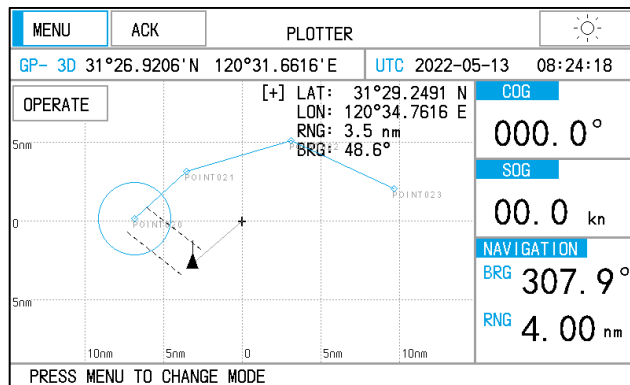
Note1:



2.6.2 Plotter display

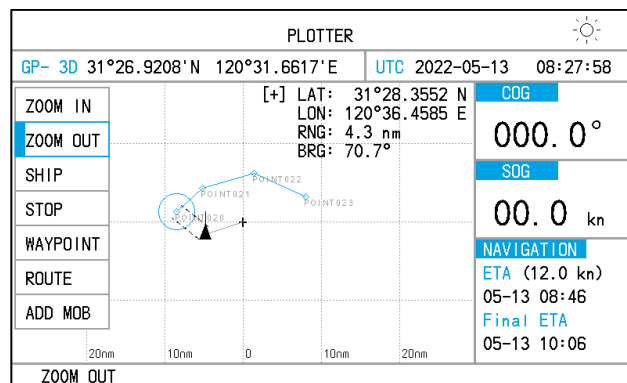
The **PLOTTER** display traces own ship's track, shows position, course, and sets the display range.



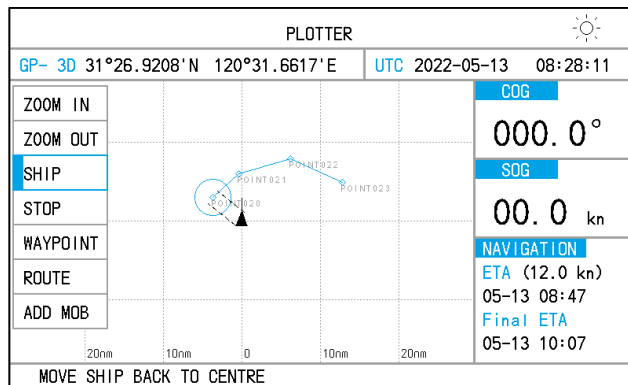


You may increase or decrease the display range on the Plotter display. The range in the Plotter display is available among 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 40, 80, 160 and 320 nautical miles.

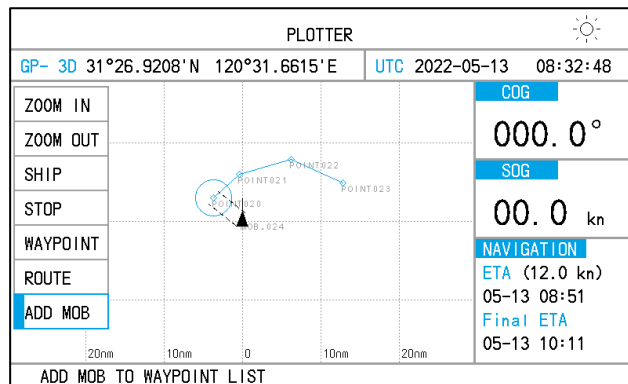
- 1) Click **OPERATE** button. The pop-up menu appears.
- 2) Click **[ZOOM IN]** or **[ZOOM OUT]** to select the desired range.
- 3) Click on any blank space to finish.



Press **[SHIP]** to return.

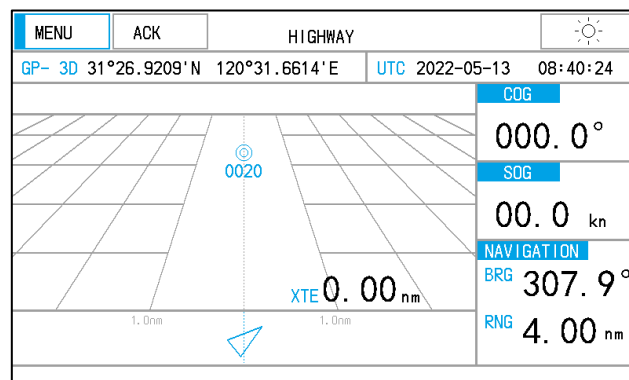


Press [ADD MOB] to add a waypoint named “MOB.XXX” based on the ship/cursor location.



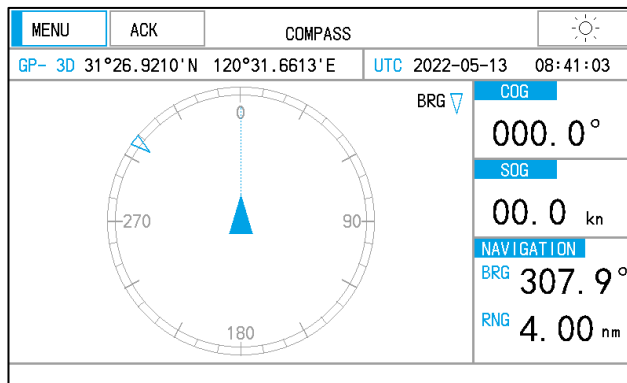
2.6.3 Highway display

The **HIGHWAY** display provides a 3-D view of own ship's route toward the destination. Navigation data is also shown.



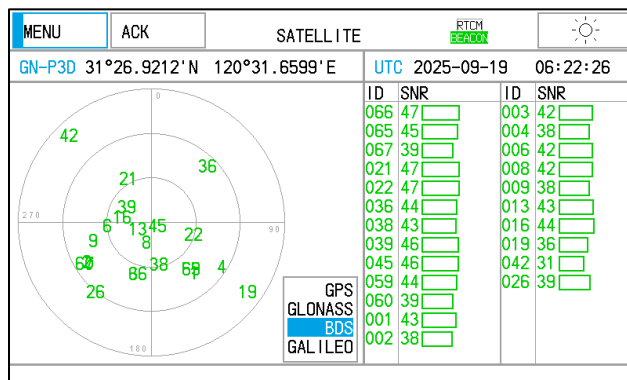
2.6.4 Compass display

The **COMPASS** display provides the course with the ship's speed, and position.



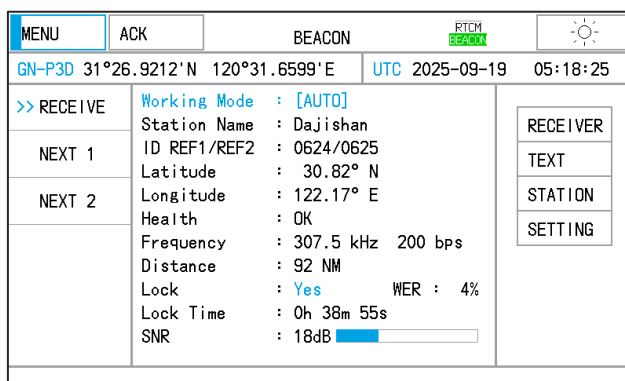
2.6.5 Satellite display

The **SATELLITE** display shows satellites currently tracked, together with the strength of receiving signals.



2.6.6 Beacon display

Click on the **SATELLITE** display to switch to the **BEACON** display and vice versa.



[RECEIVE]: The channel used to calculate location.

[NEXT 1] / [NEXT 2]: Two channels used for duty.

[TEXT]: Check special text message received from the station.

[STATION]: Check the nearest 10 stations and all stations stored.

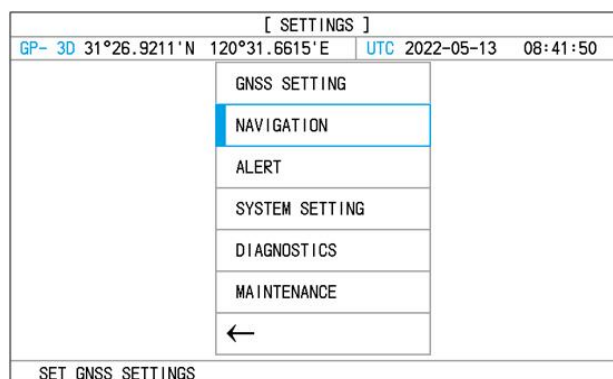
[SETTING]: Set the working mode of BEACON. See Section 5.1.5 for details.

3. NAVIGATION PLANNING

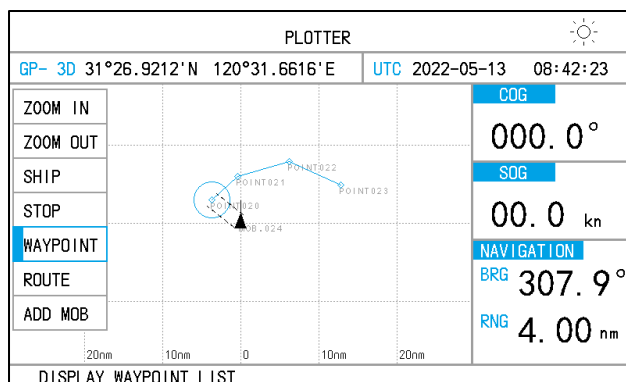
Typically, a trip from one place to another involves several course changes, requiring a series of waypoints which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. NGR-3000 can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly. NGR-3000 can store 30 routes and each route may include up to 100 waypoints.

There are two ways to enter Waypoint and Route.

- (1) Click **[MENU]-[SETTINGS]-[NAVIGATION]** to open the menu.



- (2) Click **[PLOTTER]** in **[MENU]**, then click **[WAYPOINT] / [ROUTE]** in **[OPERATE]** to open the menu.



3.1 Register Waypoints

Click **[NAVIGATION]-[WAYPOINT LIST]** to open the waypoint list.

[NAVIGATION]		RTCM					
GN-P3D	31°26.9212'N 120°31.6599' E	UTC	2025-09-19 06:24:08				
<table border="1"> <tr><td>WAYPOINT LIST</td></tr> <tr><td>ROUTE LIST</td></tr> <tr><td>NOTICE SETTING</td></tr> <tr><td>←</td></tr> </table>				WAYPOINT LIST	ROUTE LIST	NOTICE SETTING	←
WAYPOINT LIST							
ROUTE LIST							
NOTICE SETTING							
←							
Display Waypoint List							

TOTAL:024 PAGE: 1 / 4 [WAYPOINT LIST]			
GP- 3D	31°26.9210'N 120°31.6615' E	UTC	2022-05-13 08:47:02
>>	024 31°26.920'N 120°31.661'E	ADD	
	MOB.024 2022-05-13 08:29	DELETE	
	023 31°30.993'N 120°44.444'E	EDIT	
	POINT023 2022-05-13 08:22	Page ↓	
	022 31°33.588'N 120°37.905'E	Page ↑	
	POINT022 2022-05-13 08:22	GO TO	
	021 31°31.929'N 120°31.267'E	SEND	
	POINT021 2022-05-13 08:22	←	
	020 31°29.376'N 120°27.973'E		
	POINT020 2022-05-13 08:22		
	001 33°28.879'N 119°37.660'E		
	WPT. .002 2022-04-21 09:11		
Add One Waypoint Of Current Position			

- 1) Click to select the desired waypoint.
- 2) Select [ADD], [DELETE] or [EDIT] desired.

3.1.1 Insert a new waypoint

Create a new waypoint with the position as own ship's current position. The new waypoint will be inserted before the waypoint that is selected by the current cursor.

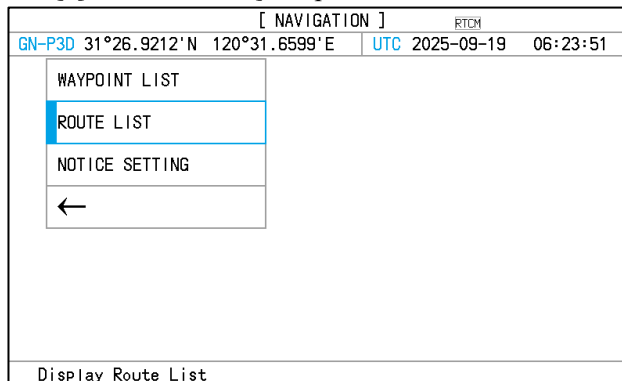
3.1.2 Edit a waypoint

Edit the selected waypoint.

TOTAL:024 PAGE: 1 / 4 [WAYPOINT EDIT]			
GP- 3D	31°26.9210'N 120°31.6616' E	UTC	2022-05-13 08:47:27
>>	024 31°26.920'N 120°31.661'E	LAT	
	MOB.024 2022-05-13 08:29	LON	
	023 31°30.993'N 120°44.444'E	NAME	
	POINT023 2022-05-13 08:22	ID	
	022 31°33.588'N 120°37.905'E	CONFIRM	
	POINT022 2022-05-13 08:22	CANCEL	
	021 31°31.929'N 120°31.267'E		
	POINT021 2022-05-13 08:22		
	020 31°29.376'N 120°27.973'E		
	POINT020 2022-05-13 08:22		
	001 33°28.879'N 119°37.660'E		
	WPT. .002 2022-04-21 09:11		

3.2 Route Planning

Click [NAVIGATION]-[ROUTE LIST] to open the route list.



1) Click to select the desired route from [ROUTE LIST].

TOTAL: 002 PAGE:1/1		[ROUTE LIST]									
GP- 3D	31°26.9213'N 120°31.6620'E	UTC	2022-05-13 08:50:29								
ID	NAME	PTS	DISTANCE								
>> 2	ROUTE - NO.00002	4	15.9 nm								
1	RTUDDIYHJKJHGVC	15	1033.8 nm								
<table border="1"> <tr><td>EDIT</td></tr> <tr><td>FORWARD</td></tr> <tr><td>REVERSE</td></tr> <tr><td>ADD</td></tr> <tr><td>DELETE</td></tr> <tr><td>Page ↓</td></tr> <tr><td>Page ↑</td></tr> <tr><td>←</td></tr> </table>				EDIT	FORWARD	REVERSE	ADD	DELETE	Page ↓	Page ↑	←
EDIT											
FORWARD											
REVERSE											
ADD											
DELETE											
Page ↓											
Page ↑											
←											

2) Click [EDIT], [FORWARD], [REVERSE], [ADD], [DELETE], [Page ↓] or [Page ↑] desired.

3.2.1 Edit a route

1) Click to select a route in [ROUTE LIST].

2) Click [EDIT] to edit the route.

3) Select [ADD], [DELETE] to add or delete a waypoint in the route, [RENAME] to rename the route.

TOTAL: 004 PAGE:1/1		[ROUTE - NO.00002]								
GP- 3D	31°26.9213'N 120°31.6618'E	UTC	2022-05-13 08:59:24							
>>	020 31°29.376'N 120°27.973'E									
	POINT020	2022-05-13 08:22								
	021 31°31.929'N 120°31.267'E	47.7 °								
	POINT021	2022-05-13 08:22	3.8 nm							
	022 31°33.588'N 120°37.905'E	73.7 °								
	POINT022	2022-05-13 08:22	5.9 nm							
	023 31°30.993'N 120°44.444'E	115.0 °								
	POINT023	2022-05-13 08:22	6.2 nm							
<table border="1"> <tr><td>ADD</td></tr> <tr><td>RENAME</td></tr> <tr><td>DELETE</td></tr> <tr><td>Page ↓</td></tr> <tr><td>Page ↑</td></tr> <tr><td>JUMP TO</td></tr> <tr><td>←</td></tr> </table>				ADD	RENAME	DELETE	Page ↓	Page ↑	JUMP TO	←
ADD										
RENAME										
DELETE										
Page ↓										
Page ↑										
JUMP TO										
←										

ADD a waypoint

Add a waypoint to the route from the route list.

Click **[ADD]** to add the current position as a new waypoint to the route.

The screen will change to **[WAYPOINT LIST]** display.

RENAME the route

Click **[RENAME]**, the pop-up menu appears.

The route name can be up to 17 characters.

The operation is as follows:

- 1) Click **[RENAME]** to rename the desired route.
- 2) Click the character among A-Z, 0-9 desired.
- 3) Click **[✓]** to finish.

DELETE a waypoint

Click **[DELETE]** to delete the selected waypoint from the route.

3.2.2 Forward navigation

Click **[FORWARD]** in **[ROUTE LIST]** menu to start navigation forward. The screen will switch to the **PLOTTER** page.

TOTAL: 002 PAGE:1/1		[ROUTE LIST]		UTC 2022-05-13 09:05:18	
ID	NAME	PTS	DISTANCE		
>> 2	ROUTE - NO.00002	4	15.9 nm	EDIT	
1	RTU001YHJKJHGVCC	15	1033.8 nm	FORWARD	
				REVERSE	
				ADD	
				DELETE	
				Page ↓	
				Page ↑	
				←	

3.2.3 Reverse navigation

Click **[REVERSE]** to start navigation in reverse. The screen will switch to the **PLOTTER** page.

3.2.4 Create a new route

Click **[ADD]** to add a new route just after the current route.

TOTAL: 003 PAGE:1/1 [ROUTE LIST]			
GP- 3D	31°26.9211'N 120°31.6619'E	UTC	2022-05-13 09:10:06
ID	NAME	PTS	DISTANCE
>> 3	ROUTE - NO.00003	0	0.0 nm
2	ROUTE - NO.00002	4	15.9 nm
1	RTU001YHJKJHGVC	15	1033.8 nm

EDIT
 FORWARD
 REVERSE
 ADD
 DELETE
 Page ↓
 Page ↑
 ←

3.2.5 Delete a route

Click **[DELETE]** to delete the selected route from the route list. Click “YES” to confirm the operation.

TOTAL: 003 PAGE:1/1 [ROUTE LIST]			
GP- 3D	31°26.9212'N 120°31.6619'E	UTC	2022-05-13 09:10:28
ID	NAME	PTS	DISTANCE
>> 3	ROUTE - NO.00003	0	0 nm
2	ROUTE - NO.00002	9	9 nm
1	RTU001YHJKJHGVC	8	8 nm

CONFIRM
 NO
 YES

EDIT
 FORWARD
 REVERSE
 ADD
 DELETE
 Page ↓
 Page ↑
 ←

3.3 Stop the Navigation by the Current Route

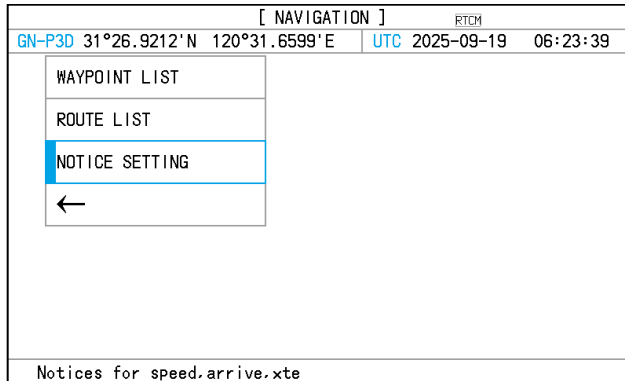
PLOTTER		GP- 3D 31°26.9213'N 120°31.6620'E UTC 2022-05-13 09:12:17	
ZOOM IN		COG	000.0°
ZOOM OUT		SOG	00.0 kn
SHIP		NAVIGATION	BRG 307.9°
STOP		RNG	4.00 nm
WAYPOINT			
ROUTE			
ADD MOB			
ROUTE STOP			

Click **[PLOTTER]** in **[MENU]**, then click **[STOP]** to stop the navigation by the current route. The route is cleared on the **PLOTTER** display.

4. NAVIGATION ALARMS

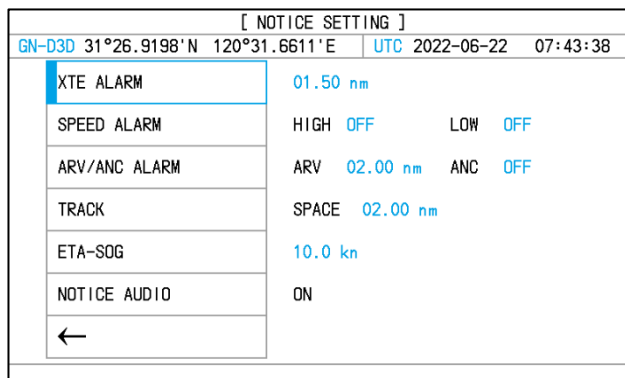
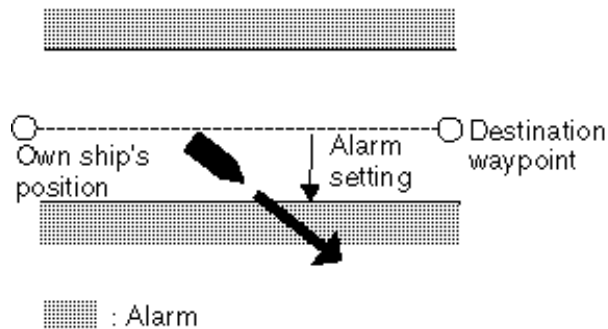
Important Note: All these navigational alarms (XTE, SPEED, ARV, ANC) should be switched off on SOLAS- (or IMO-) compliant ships.

Select [SETTINGS]-[NAVIGATION]-[NOTICE SETTING] to open the menu.



4.1 XTE (Cross Track Error) Alarm

The XTE alarm warns you by an internal buzzer when own ship is off its intended route.



[NOTICE SETTING]																																													
GN-D3D 31°26.9197'N 120°31.6610'E UTC 2022-06-22 07:45:37																																													
XTE ALARM	01.50 nm																																												
SPEED ALARM	HIGH OFF LOW OFF																																												
ARV/ANC ALARM	ARV 02.00 nm ANC OFF																																												
TRACK	SPACE 02.00 nm																																												
<table border="1"> <tr> <td>123</td> <td colspan="9"></td> <td>00.00 nm</td> </tr> <tr> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>⌫</td> </tr> <tr> <td></td> <td>N</td> <td>S</td> <td>E</td> <td>W</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>☰</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>☑</td> </tr> </table>		123										00.00 nm	0	1	2	3	4	5	6	7	8	9	⌫		N	S	E	W							☰										☑
123										00.00 nm																																			
0	1	2	3	4	5	6	7	8	9	⌫																																			
	N	S	E	W																																									
☰										☑																																			

- 1) Click the value field to edit.
- 2) Click the digits among 0-9 until the desired digit is obtained.
- 3) When the value is set to 0, the alarm will be turned off.

4.2 Speed Alarm

The speed alarm is activated when the ship's speed is higher (or lower) than the set value.

[NOTICE SETTING]																																													
GN-D3D 31°26.9198'N 120°31.6612'E UTC 2022-06-22 07:46:06																																													
XTE ALARM	01.50 nm																																												
SPEED ALARM	HIGH OFF LOW OFF																																												
ARV/ANC ALARM	ARV 02.00 nm ANC OFF																																												
TRACK	SPACE 02.00 nm																																												
<table border="1"> <tr> <td>123</td> <td colspan="9"></td> <td>20.0 kn</td> </tr> <tr> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>⌫</td> </tr> <tr> <td></td> <td>N</td> <td>S</td> <td>E</td> <td>W</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>☰</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>☑</td> </tr> </table>		123										20.0 kn	0	1	2	3	4	5	6	7	8	9	⌫		N	S	E	W							☰										☑
123										20.0 kn																																			
0	1	2	3	4	5	6	7	8	9	⌫																																			
	N	S	E	W																																									
☰										☑																																			

LOW: Alarm is activated when the speed is lower than the speed set in the field.

HIGH: Alarm is activated when the speed is higher than the speed set in the field.

- 1) Click the **HIGH/LOW** speed value to edit.
- 2) Click the digits among 0-9 until the desired digit is obtained.
- 3) When the value is set to 0, the alarm will be turned off.

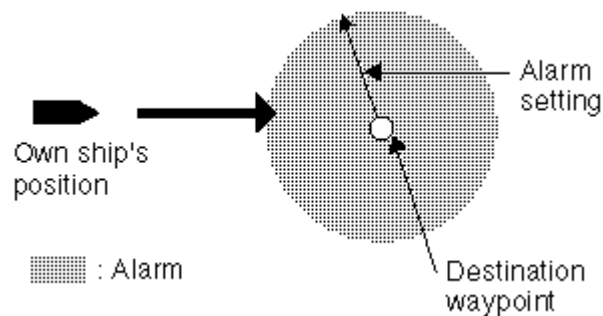
4.3 Arrival Alarm and Anchor Watch Alarm

You may activate the arrival alarm or the anchor watch alarm, but they cannot be activated together.

[NOTICE SETTING]	
GN-D3D 31°26.9198'N 120°31.6612'E UTC 2022-06-22 07:46:25	
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
ETA-SOG	10.0 kn
NOTICE AUDIO	ON
←	

● Arrival Alarm

The arrival alarm informs you that own ship is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from the outside of the circle. The alarm will be activated if own ship enters the circle.

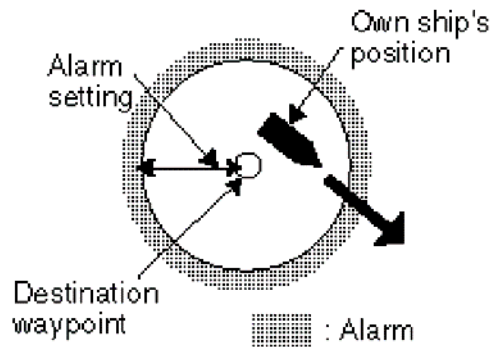


- 1) Click the **ARV** alarm value to edit.
- 2) Click the digits among 0-9 until the desired digit is obtained.
- 3) Turn the knob to move the cursor to the next digit to edit.
- 4) When the value is set to 0, the alarm will be turned off.

The alarm range is (0.01-99.99 nm).

● Anchor Watch Alarm

The anchor watch alarm sounds to warn you that own ship is moving beyond the set area.



Before setting the anchor watch alarm, set the current position as the destination.

- 1) Click the **ANC** alarm value to edit.
- 2) Click the digits among 0-9 until the desired digit is obtained.
- 3) Turn the knob to move the cursor to the next digit to edit.
- 4) When the value is set to 0, the alarm will be turned off.

The alarm range is (0.01-99.99 nm).

Note:

The anchor watch alarm and arrival alarm are combined to serve a route. After a route is finished while the destination is arrived at, keep the navigation on the route while setting **ANC**. The anchor watch starts.

4.4 Track Record

Click [**TRACK**] to set the interval of every two recorded dots.

[NOTICE SETTING]	
GN-D3D 31°26.9199'N 120°31.6612'E UTC 2022-06-22 07:46:48	
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
ETA-SOG	10.0 kn
NOTICE AUDIO	ON
←	

If **OFF** is selected, the track will not be recorded.

If **SPACE** is selected, the track will be recorded every certain distance which can be configured.
 If **AUTO** is selected, the track will be recorded every minute or every certain distance which

can be configured, whichever is reached first.

4.5 ETA-SOG

When forwarding a route, but $SOG < 0.4$ kn, ETA will be calculated according to this SOG. The default is 10.0 kn.

[NOTICE SETTING]	
GN-D3D	31°26.9198' N 120°31.6611' E UTC 2022-06-22 07:47:08
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
ETA-SOG	10.0 kn
NOTICE AUDIO	ON
←	
Set up a custom SOG for computing ETA when $SOG < 0.4$ kn.	

4.6 Notice Audio

Set whether an audible alarm is required for Notice.

5. MENU SETTING

5.1 GNSS Setting

Click [MENU]-[SETTINGS]-[GNSS SETTING] to open the menu as follows.

[GNSS SETTING]		RTCM
GN-P3D	31°26.9213'N 120°31.6601'E	UTC 2025-09-19 07:07:04
GNSS MODE		
GEODETIC DATUM	WGS84	
RAIM		
DIFFERENTIAL MODE	AUTO	
SMOOTHING		
←		
SET THE GNSS mode		

It includes **GNSS MODE**, **GEODETIC DATUM**, **RAIM**, **DIFFERENTIAL MODE** and **SMOOTHING** settings.

5.1.1 GNSS mode

There are four modes that can be selected: GPS, GLONASS, BDS and GALILEO.

[GNSS MODE SELECT]		RTCM
GN-P3D	31°26.9212'N 120°31.6599'E	UTC 2025-09-19 05:17:14
GPS	✓	
GLONASS	✓	
BDS	✓	
GALILEO	✓	
←		

5.1.2 Geodetic datum

Totally, there are six systems to be selected: WGS84 (default), PZ90 , CK-42, CK-95, CK-2011 and BDCS.

[GEGEDTIC DATUM]		RTCM	
GN-P3D	31°26.9212' N	120°31.6599' E	UTC 2025-09-19 05:17:23
WGS84			
PZ90			
CK-42			
CK-95			
CK-2011			
BDCS			
←			

5.1.3 RAIM

5.1.3.1 RAIM

RAIM (Receiver Autonomous Integrity Monitoring) can be set to **ON** or **OFF**.

When set to **ON**, RAIM will display SAFE, UNSAFE or CAUTION in the following conditions:

- **Conditions for the "safe" state**

The result of the integrity calculation by means of RAIM will be stated as "safe", if the integrity calculation can be performed with a confidence level above 95 % for the selected accuracy level and RAIM calculates the probable position error to be within the selected accuracy level.

This generally requires at least 5 "healthy" satellites available and in a robust geometry, i.e. the worst 4 satellite geometry is still suitable for navigation.

- **Conditions for the "caution" state**

The "caution" status will be used to indicate:

- Insufficient information to reliably calculate with a confidence level above 95 % for the selected accuracy level, or
- The probability of false alarms >5 %, or
- The probability of not detecting an error condition >5 %.

Those conditions may occur if an insufficient number of satellites are available, for example, 4 or 5 with 2 satellites "close" together in azimuth and elevation, causing the geometry to degrade to the point that the RAIM calculation becomes unreliable. Note that the resulting accuracy based on 4 or 5 satellites in use may be within the selected accuracy level, but the RAIM algorithm cannot verify it.

- **Conditions for the "unsafe" state**

The "unsafe" status will be used if the integrity calculation is performed with a confidence level above 95 % for the selected accuracy level, and RAIM calculates the probable

position error exceeding the selected accuracy level. Note that also here a robust geometry is required to reach this confidence level. The "unsafe" state can be reached when satellite range errors degrade the navigation solution, causing the resulting accuracy to be outside the selected accuracy level.

5.1.3.2 RAIM level

RAIM level can be set between 10 ~ 100m.

[RAIM]		RTCM
GN-P3D	31°26.9212'N 120°31.6599'E	UTC 2025-09-19 07:10:50
RAIM	ON	
RAIM LEVEL	100m	
←		

5.1.4 Differential mode

This menu is used to set the differential mode, distance and enter **BEACON SCREEN**.

Click [**MODE**] to change the mode among B2b-PPP, BEACON, SBAS and AUTO options.

[SBAS] is a differential mode based on satellite. The coverage is wider, but not as accurate as BEACON. [B2b-PPP] is a precise point positioning mode, after stabilizing for 20 minutes, the accuracy can reach 0.5 meters. [B2b-PPP] only works in Asia.

[AUTO]: Use B2b-PPP > BEACON > SBAS.

[DIFFERENTIAL MODE]		RTCM
GN-P3D	31°26.9213'N 120°31.6600'E	UTC 2025-09-19 07:08:47
MODE	AUTO	
DISTANCE	100 nm	
BEACON SCREEN		
←		
Set differential mode [AUTO/INT BEACON/EXT BEACON/OFF/SBAS]		

Note: RTCM indicates that the differential signal of the base station is locked, RTCM message is received.

Click **[BEACON SCREEN]** to open the BEACON window as follows.

MENU		ACK	BEACON		RTCM BEACON	
GN-P3D		31°26.9212' N	120°31.6599' E	UTC	2025-09-19	05:18:25
>> RECEIVE	Working Mode : [AUTO] Station Name : Dajishan ID REF1/REF2 : 0624/0625 Latitude : 30.82° N Longitude : 122.17° E Health : OK Frequency : 307.5 kHz 200 bps Distance : 92 NM Lock : Yes WER : 4% Lock Time : 0h 38m 55s SNR : 18dB				RECEIVER TEXT STATION SETTING	
NEXT 1						
NEXT 2						

5.1.4.1 Set beacon mode

Click **[SETTING]** in **BEACON SCREEN** to set BEACON mode. The following menu appears.

SETTING		RTCM BEACON
GN-P3D		31°26.9212' N 120°31.6599' E UTC 2025-09-19 05:18:40
Working Mode AUTO 307.5 kHz 200 bps [Current Receive] Station Name : Dajishan ID REF1/REF2 : 0624/0625 Latitude : 30.82° N Longitude : 122.17° E Health : OK Frequency : 307.5 kHz Bit Rate : 200 bps Lock : Yes		MODE DIAGNOSIS MONITOR ←

Click **[MODE]** to switch directly between **[AUTO]**, **[MANUAL]** and **[SCAN]**.

MODE SETTING		RTCM BEACON
GN-P3D		31°26.9212' N 120°31.6599' E UTC 2025-09-19 05:18:53
Working Mode : AUTO Frequency : 307.5 kHz Bit Rate : 200 bps		MODE FREQ BPS ←
AUTO/MANUAL/SCAN		

[AUTO]: Search the nearest 10 base stations for DGNSS signals.

[MANUAL]: Lock the DGNSS signal according to the set frequency and bit rate.

[SCAN]: Search for DGNSS signals at all frequencies and bit rates.

5.1.4.2 Station list

Click [STATION] in BEACON SCREEN. The following screen appears.

STATION				RTCM BEACON	
GN-P3D	31°26.9212'N	120°31.6599'E	UTC	2025-09-19	05:19:06
NO.	RNG	Description			
>> 1	69	Station Name : Haozhigang			NEAR
2	92	ID REF1/REF2 : 0622/0623			LOCK
3	117	Latitude : 32.02° N			ALL
4	186	Longitude : 121.72° E			←
5	199	Health : NORMAL			
6	210	Frequency : 304.0 kHz			
7	277	Bit Rate : 200			
8	280				
9	308				
10	362				

[LOCK]: Manually lock to the selected station.

[ALL]: Check all stored stations.

ALL STATION						RTCM BEACON	
GN-P3D	31°26.9212'N	120°31.6599'E	UTC	2025-09-19	05:19:59		
NO.	LAT	LON	FREQ	BPS	NAME		
>> 1	26.12°N	050.65°E	298.0	200	Bahrain	VIEW	
2	29.12°N	048.14°E	295.0	200	Kuwait	Page ↓	
3	25.98°N	056.07°E	292.0	200	Ras Al Khaimah	Page ↑	
4	24.10°N	052.93°E	314.0	200	Abu Dhabi	LOCK	
5	20.71°S	116.77°E	304.0	200	Karratha	RESET	
6	40.32°N	050.60°E	309.5	200	Baku	←	
7	22.16°N	092.05°E	305.0	200	Chittagong		
8	23.02°N	089.23°E	295.0	200	Monirampur. Jes		
9	24.81°N	090.44°E	300.0	200	Mymensingh		
10	51.22°N	002.93°E	312.0	200	Oostende		

5.1.4.3 Beacon self-test

Click [SETTING]-[DIAGNOSIS] in BEACON SCREEN. Then click [SELFTEST] to start the self-test. The system will send 20 packets to check the receiver.

DIAGNOSIS				LOCK	
NO FIX	31°26.9211'N	120°31.6606'E	UTC	2022-08-15	02:06:23
Working Mode	SELFTEST 307.5 kHz 200 bps				
[BEACON]					
Version	: 20-08-21 V100				
On Time	: 220561 s				
	[CH1]	[CH2]	[CH3]		
Freq	307.5 kHz	307.5 kHz	307.5 kHz		
bps	200	200	200		
RSSI	-54	-54	-53		
Receive	15/20	15/20	15/20		
1/3	3012	Integrity status			

5.1.5 Smoothing

Change the COG and SOG smoothness.

[SMOOTH SETTING]					
GN-P3D	31°26.9212'N	120°31.6599'E	UTC	2025-09-19	05:21:24
SOG		OFF			
COG		OFF			
←					
SET SOG SMOOTHING [OFF/AUTO/1-9]					

5.2 System Setting

Click [MENU]-[SETTINGS]-[SYSTEM SETTING] to open the menu as follows.

[SYSTEM SETTING]					
GN-P3D	31°26.9212'N	120°31.6599'E	UTC	2025-09-19	05:21:44
KEY BUZZER		OFF			
LCD/KEY DIMMER		Level_10			
DAY/NIGHT		DAY			
OFFSET & TIME ZONE					
UNIT		kn, nm			
←					
SET KEY BUZZER ON/OFF					

It includes **KEY BUZZER**, **LCD/KEY DIMMER**, **DAY/NIGHT**, **OFFSET & TIME ZONE** and **UNIT** items.

5.2.1 Key buzzer

Key buzzer can be turned off so that the operation is not heard.

5.2.2 LCD/KEY dimmer

Dimmer can be adjusted either by **DIM** button or set in the menu.

[SYSTEM SETTING]		RTCM
GN-P3D	31°26.9212'N 120°31.6599' E	UTC 2025-09-19 05:21:54
KEY BUZZER	OFF	
LCD/KEY DIMMER	Level_10	
DAY/NIGHT	DAY	
OFFSET & TIME ZONE		
UNIT	kn, nm	
←		
SET LCD/KEY DIMMER : 1 - 13		

5.2.3 Day/Night

Change the display mode between **DAY** and **NIGHT**. For example:

[SYSTEM SETTING]		RTCM
GN-P3D	31°26.9212'N 120°31.6599' E	UTC 2025-09-19 05:22:03
KEY BUZZER	OFF	
LCD/KEY DIMMER	Level_10	
DAY/NIGHT	NIGHT	
OFFSET & TIME ZONE		
UNIT	kn, nm	
←		
CHANGE DISPLAY MODE DAY/NIGHT		

MENU	ACK	DATA	RTCM BEACON	
FIX	HDOP	RAIM	RAIM LEVEL	
GN-P3D	0.4	Safe	100m	
WGS84			TIME	
31°26.9212'N			2025-09-19 05:22:26 UTC	
120°31.6599'E			LAST FIX	
			2025-09-19 05:22:26 UTC	
COG	SOG	SATELLITE:		
163.4°	00.0 kn	GPS: 09 GLO: 08		
		GAL: 10 BDS: 20		

You can also click the / icon at the upper right corner of the main screen to change the display between day mode and night mode.

5.2.4 Offset & Time zone

[OFFSET & TIME ZONE]	
GP- 3D 31°26.9204' N 120°31.6615' E	UTC 2022-05-13 11:34:05
TIME MODE	UTC
TIME ZONE	+00:00
LATITUDE OFFSET	00.0000' N
LONGITUDE OFFSET	00.0000' E
ANT HEIGHT	020 m
←	
SET TIME MODE UTC/LMT	

[TIME MODE]: Time can be set as **UTC** or **LMT** in **TIME MODE**.

[TIME ZONE]: Set time zone from **-13:00** to **+13:00**.

[LATITUDE OFFSET]: Set the latitude offset to add to the calculation of the position.

[LONGITUDE OFFSET]: Set the longitude offset to add to the calculation of the position.

[ANT HEIGHT]: Set the height of the GNSS antenna.

5.2.5 Unit

Unit can be set as **kn**, **NM** or **km/h**, **km**.

5.3 Alert

List of all alerts that could be generated:

ID	Ins	Cat	Prio	Escal	Resp	Alert Title	Alert description
3056	1	B	C	/	/	HDOP exceeded	HDOP > 4.0 check antenna
3015	2	B	W	W	Yes	Loss of position	Loss of position check antenna
3055	3	B	W	W	Yes	DGNSS Lost*	Loss of differential signal
3012	4	B	W	W	Yes	Integrity status	Accuracy is unsafe check antenna

Ins: Instance of an alert;

Prio: Alert priority (W – Warning, C – Caution);

Cat: Alert category;

Escal: W – An unacknowledged warning will be repeated as a warning after 4 minutes;

Resp: Transfer responsibility.

*: “DGNSS Lost” takes effect when BEACON is selected.

When an alert occurs, the buzzer sounds (except for a caution) and the title of the alert appears at the bottom of the display. Click on the bottom to enter the alert list.

MENU	ACK	DATA	REASON	
FIX	HDOP	RAIM	RAIM LEVEL	
NO FIX	N/A	Unsafe	100m	
WGS84		Searching...	TIME	
31°26.9209' N 120°31.6604' E			2025-09-19 05:23:47	UTC
		LAST FIX	2025-09-19 05:23:38	UTC
COG	SOG	SATELLITE:		
163.4°	00.0 kn	GPS: 01	GLO: 07	
		GAL: 01	BDS: 20	
1/2 3012 Integrity status				

Alert mark description:

MARK	PRIORITY	STATE
	WARNING	ACTIVE-UNACKNOWLEDGED
		ACTIVE-SILENCED
		ACTIVE-ACKNOWLEDGED
MARK	PRIORITY	STATE
	WARNING	ACTIVE-RESPONSIBILITY TRANSFERRED
		RECTIFIED-UNACKNOWLEDGED
	CAUTION	ACTIVE

Click **[MENU]-[SETTINGS]-[ALERT]** to open the **[ALERT]** screen, it shows all currently alerts. Time is synchronized when GNSS is fixed, and not synchronized when GNSS is not fixed.

[ALERT LIST]				
NO FIX	31°26.9206' N	120°31.6610' E	UTC	2025-09-19 05:25:13
ID	ALERT	TIME (UTC)		
>	3015 Loss of position	09-19 05:25	ACK	
	3012 Integrity status	09-19 05:25	MUTE	
	3056 HDOP exceeded	09-19 05:25	VIEW	
			HISTORY	
1/3 3015 Loss of position				

> : Point to the currently selected alert, click the alert to select.

[ACK]: Acknowledge the alert selected.

[MUTE]: Make all alerts silent for 30 seconds.

[VIEW]: View the details of the alert selected, which will show as below.

[HISTORY]: View the alert history.

[←]: Back to upper menu.

[PWR]: Short-press the button to return to the main screen.

[ALERT VIEW]	
NO FIX	31°26.9203'N 120°31.6620'E UTC 2022-05-13 03:18:47
ID	3015 : 2
CATEGORY	B
PRIORITY	WARNING
STATE	ACTIVE-UNACKNOWLEDGED
DESCRIPTION	Loss of position Loss of position check antenna
←	
2/4 📍 3015 Loss of position	

5.4 Diagnostics

Click [MENU]-[SETTINGS]-[DIAGNOSTICS] to check software version, keypad and LCD for proper operation, etc.

[SETTINGS]	
GP- 3D	31°26.9204'N 120°31.6612'E UTC 2022-05-13 11:44:23
GNSS SETTING	
NAVIGATION	
ALERT	
SYSTEM SETTING	
DIAGNOSTICS	
MAINTENANCE	
←	
CARRY OUT SELF TEST	

5.4.1 Program version

Select [PROGRAM VERSION] item to check the software version, etc.

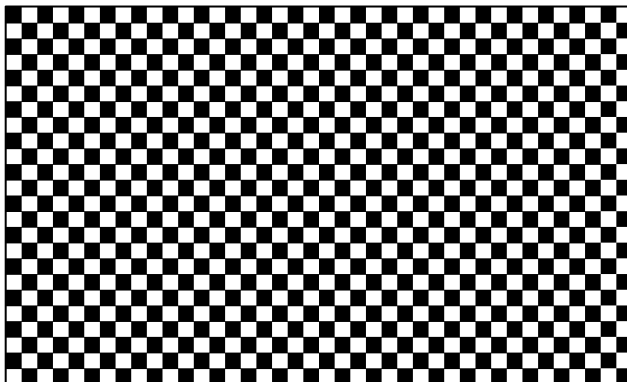
[PROGRAM VERSION]		RTCM
GN-P3D	31°26.9212'N 120°31.6599'E	UTC 2025-09-19 06:33:26
[APP]	Version : v2.15 2025/09/19	←
[BEACON]	Version : v1.02 2022/10/21	
[HARDWARE]	RECEIVER: R4.10Build11833 FLASH1: OK AUDIO: OK SDRAM: OK FLASH2: OK	

5.4.2 LCD test

LCD TEST is used for testing the screen.

Click [LCD TEST] to enter the test screen, turn the knob continuously to test the LCD.

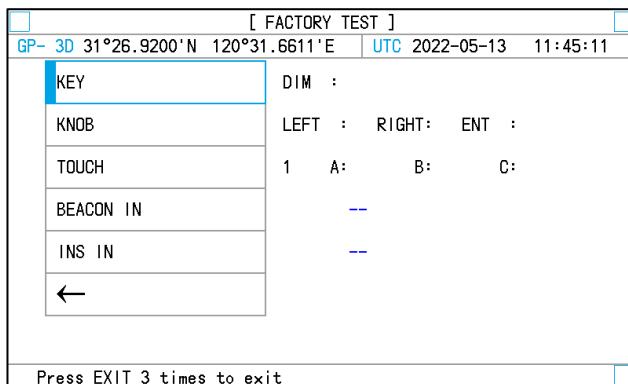
Press the knob to exit.



5.4.3 Factory test

It is designed to test whether the key, knob and touch-screen are working or not, etc.

Click [FACTORY TEST] to enter the following view.



KEY test: Press **DIM** key.

KNOB test: Turn the knob to left and right, then press it.

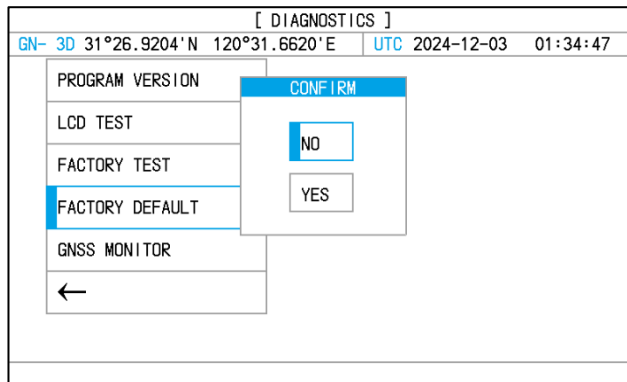
TOUCH test: Touch the corner of the screen. The box corresponding to the item will be filled with blue color.

If everything is good, **OK** icon will appear.

5.4.4 Factory default

FACTORY DEFAULT is to return the system to factory default settings.

Select [FACTORY DEFAULT] item in [DIAGNOSTICS] menu, then click “YES” to confirm the operation.

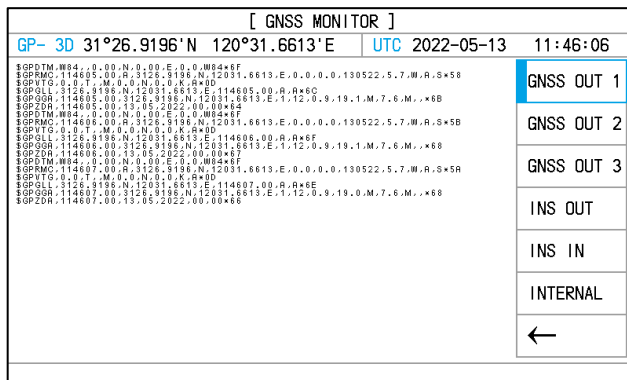


Note:

The navigation settings and GNSS settings will be restored to factory default, while the waypoints and routes registered remain unchanged.

5.4.5 GNSS monitoring

It's to check the GNSS data appearing on output ports.



6. INSTALLATION

6.1 Installation of Main Unit

The main unit can be installed on a table-top, on the overhead, or in a panel (optional flush mounting brackets required). Refer to the drawings at the end of this manual for installation instructions. When selecting a mounting location, keep in mind the following points:

- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Locate the unit away from equipment that generates electromagnetic fields, such as a motor or generator.
- Allow sufficient maintenance space at the sides and rear of the unit and leave sufficient slack in cables, to facilitate maintenance and servicing.
- Observe the following compass safe distances to prevent deviation of a magnetic compass. Standard compass, 0.2 m. Steering compass, 0.15 m.

6.2 Installation of Antenna Unit

Install the antenna unit by referring to the antenna installation drawings at the end of this manual. When selecting a mounting location for the antenna unit, keep in mind the following points:

- Do not cut the antenna cable.
- Select a location out of the radar beam. The radar beam will obstruct or prevent the reception of the GNSS signal.
- The location should be well away from a VHF/UHF antenna. GNSS equipment is interfered with by a harmonic wave of a VHF/ UHF antenna.
- There should be no obstruction within the line-of-sight to the satellites. Objects within line-of-sight to a satellite, for example, a mast, may block reception or prolong acquisition time.
- Mounting the antenna unit as high as possible keeps it free from interfering objects and water spray, which can interrupt reception of GNSS satellite signal if the water freezes.
- If the antenna cable is to be passed through a hole that is not large enough to pass the connector, you may unfasten the connector. Refasten it after running the cable through the hole.

6.3 Cabling

6.3.1 Power connection

PIN NO.	DESCRIPTION	TYPE
13	PWR (+24V)	DC Power
14	PWR (0V)	

The power cable with a rated capacity of 3A should be used. Pin definition for the connector is shown above.

Suggest using the 3A Power Supply Unit (DC 24V output).

6.3.2 Interfaces

PIN NO.	DESCRIPTION	TYPE
1	BEACON IN+	RTCM2.X/3.X
2	BEACON IN-	
3	GNSS OUT 1+	IEC 61162-1/ IEC 61162-2
4	GNSS OUT 1-	
5	GNSS OUT 2+	IEC 61162-1/ IEC 61162-2
6	GNSS OUT 2-	
7	GNSS OUT 3+	IEC 61162-1/ IEC 61162-2
8	GNSS OUT 3-	
9	BAM OUT+	IEC 61162-1/ IEC 61162-2
10	BAM OUT-	
11	BAM IN+	IEC 61162-1/ IEC 61162-2
12	BAM IN-	
13	PWR (+24V)	DC Power
14	PWR (0V)	

[Beacon IN] is used to receive the differential signal from DGNSS beacon.

[GNSS OUT] is used to output position data.

The default baud rate is 4800 bps, which can also be changed among 4800/ 9600 / 19200 / 38400 bps.

6.3.3 Alert interface

There is one alert interface (IEC 61162-1/IEC 61162-2) for BAM.

PIN NO.	DESCRIPTION	TYPE
9	BAM OUT+	IEC 61162-1/ IEC 61162-2
10	BAM OUT-	
11	BAM IN+	IEC 61162-1/ IEC 61162-2
12	BAM IN-	

The alert list is described in Section 5.3.

6.3.4 Grounding

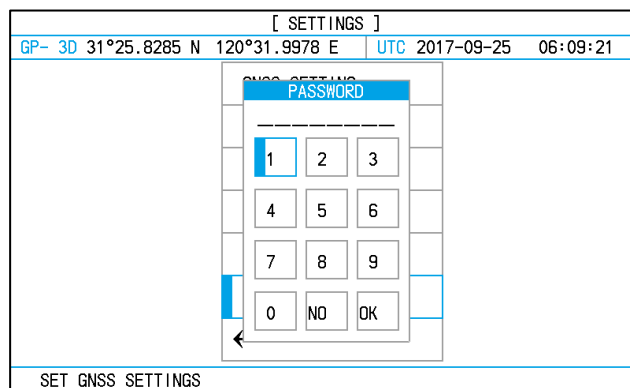
Ground the unit as follows to prevent interference:

- The ground wire should be 1.25mm² or larger.
- The ground wire should be as short as possible.

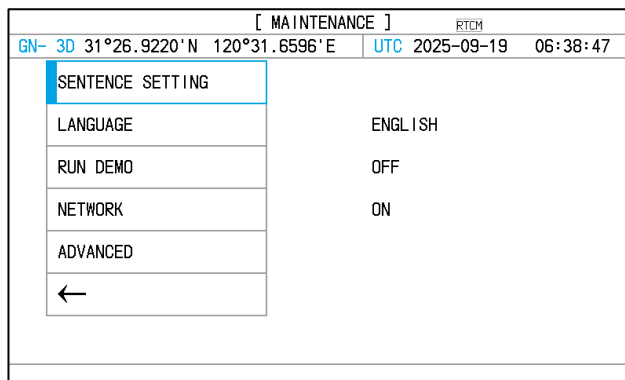
6.4 Initial Settings

This equipment can output navigation data to external equipment, in NMEA 0183 format. For example, it can output position data to a radar or echo sounder.

Initial settings are done in the menu of **[MAINTENANCE]**.



A password is required to enter **[MAINTENANCE]**.



6.4.1 Language setting

[LANGUAGE]: Change language (ENGLISH/中文).

6.4.2 Sentence setting

For each GNSS data output, the following items can be configured.

- **Data sentences:**

The following sentences are available: GBS, GNS, GGA, DTM, RMC, VTG, ZDA, GSA, XTE, WPL, BOD, RTE, GLL, APB, VLW, GFA, GRS, GST, GSV, RMB, BWC. When selecting sentences, the load rate needs to be kept below 100%. Each sentence can be set to be sent once every 1/2/5/10 seconds.

- **NMEA version**

There are five versions to be selected: NMEA1.5, NMEA2.0, NMEA2.3, IEC61162 Ed4 and IEC61162 Ed5.

- **Baudrate**

It can be 4800/9600/19200/38400bps.

6.4.2.1 Sentence

Click [MAINTENANCE]-[SENTENCE SETTING], the following menu appears.

[OUTPUT SENTENCE]		
GP- 3D 31°26.9196'N 120°31.6616'E	UTC 2022-05-13	11:46:49
GNSS OUT 1 & BEACON IN	IEC61162 Ed5	4800 BPS
GNSS OUT 2	IEC61162 Ed5	4800 BPS
GNSS OUT 3	IEC61162 Ed5	4800 BPS
INS/BAM IN & OUT	IEC61162 Ed5	4800 BPS
TALKER ID	GP	
←		

Click the ports to set the sentence. For example:

[SENTENCE SETTING]	
GP- 3D 31°26.9205'N 120°31.6617'E	UTC 2022-05-13 11:53:05
SENTENCE	
BAUDRATE	4800 BPS
VERSION	IEC61162 Ed5
←	
Select the Sentence need output	

Click each sentence continuously to choose 1s/2s/5s/10s. "--" means no output.

[OUTPUT SENTENCE]				RTCM	
GN-P3D	31°26.9212'N	120°31.6602'E	UTC	2025-09-19	06:44:32
GBS	1 s	XTE	--	BWC	--
GNS	--	WPL	1 s	←	
GGA	1 s	BOD	--		
DTM	1 s	RTE	1 s		
RMC	1 s	GLL	--		
VTG	--	APB	--		
ZDA	1 s	GFA	--		
GSA	--	RMB	--		Load Rate: 80%

Data sentence description

ACN: Equipment is operating normally, or for supervision of a connection between two units.

ALC: Cyclic alert list. The cyclic alert list transmission shall never stop. When all alerts are in normal state, the cyclic alert list is empty i.e. the number of alert entries is 0.

ALF: Report an alert condition and the alert state of a device. An ALF message shall be published for an alert each time the alert information in this sentence changes and on alert request (see ALC - Cyclic alert list).

GNS: Fix data for GPS, GLONASS.

GBS: Support Receiver Autonomous Integrity Monitoring (RAIM).

GGA: GPS position fixing condition (time of fix, latitude, longitude, receiving condition, number of satellites used, DOP).

HBT: The sentence is transmitted at regular intervals specified in the corresponding equipment standard. The repeat interval may be used by the receiving unit to set the time-out value for the connection supervision.

RMC: Generic navigational information (UTC time, latitude, longitude, ground speed, true course, day, month, year).

VTG: Actual track and ground speeds.

ZDA: UTC time (day, month, year).

DTM: Datum reference.

GSA: GNSS receiver operating mode, satellites used in the navigation solution reported by the GGA 2148 or GNS sentences, and DOP values.

RTE: Waypoint identifiers, listed in order with the starting waypoint first, for the identified route.

BWC: Bearing and distance to waypoint - Great circle.

RMB: Recommended minimum navigation information.

XTE: Cross-track error, measured.

WPL: Latitude and longitude of specified waypoint.

Note 1: As default, GGA, DTM, RMC, VTG, ZDA, DTM, WPL, RTE and GBS are selected.

Note 2: Click [TALKER ID], you can modify the Talker ID of the output sentence.

6.4.2.2 Baud rate

Select each of the four outputs to configure the baud rate.

The default baud rate of all ports is 4800bps.

Click BAUDRATE continuously until a desired rate is shown.

[SENTENCE SETTING]	
GP- 3D 31°26.9200' N 120°31.6619' E	UTC 2022-05-13 11:57:36
SENTENCE	
BAUDRATE	4800 BPS
VERSION	IEC61162 Ed5
←	
Set baudrate [4800/9600/19200/38400]	

The baud rate can be selected among 4800/9600/19200/38400bps.

6.4.2.3 NMEA version

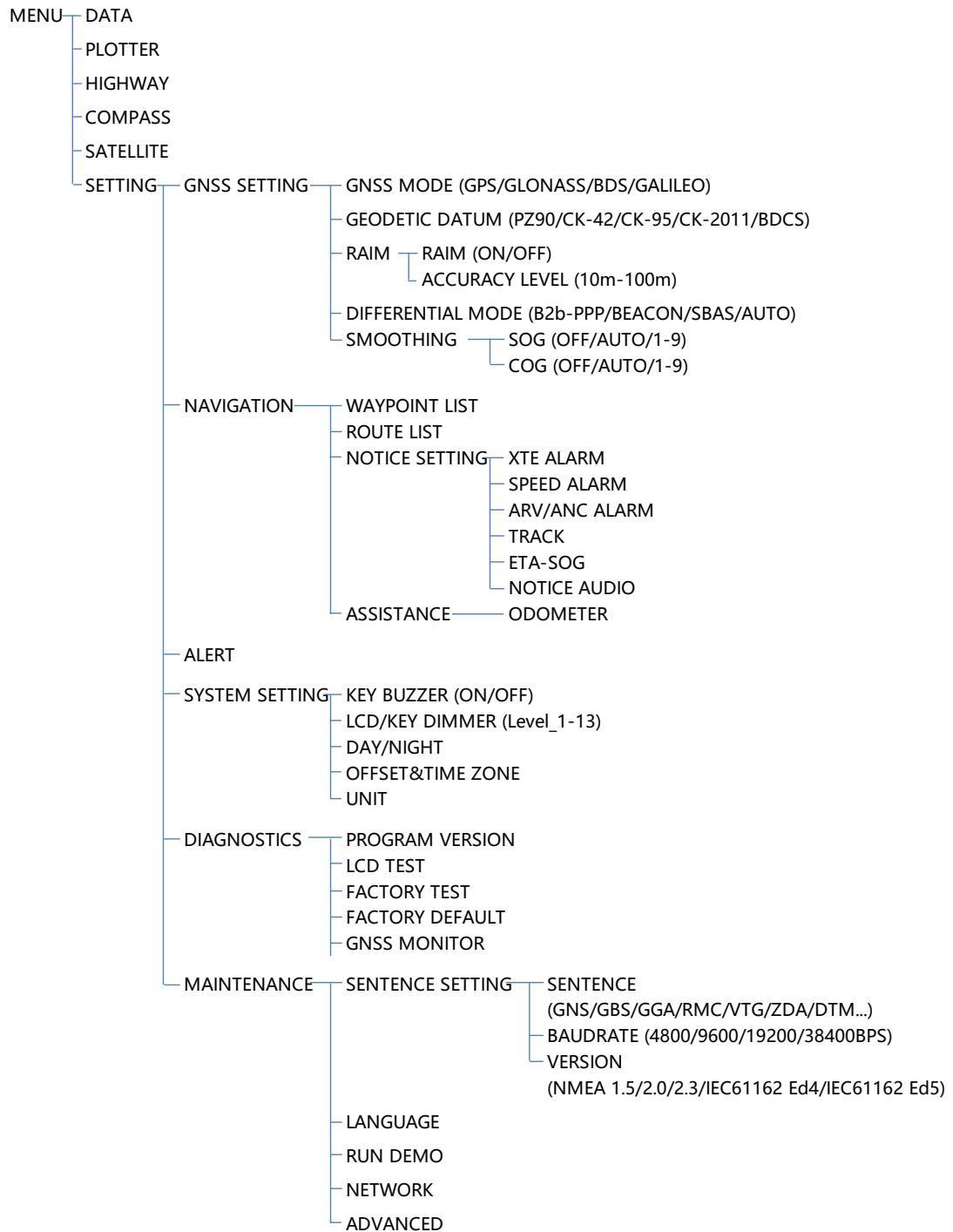
Select each of the four outputs to configure the NMEA version.

Click VERSION continuously until the desired one is shown.

[SENTENCE SETTING]	
GP- 3D 31°26.9201' N 120°31.6619' E	UTC 2022-05-13 11:58:07
SENTENCE	
BAUDRATE	4800 BPS
VERSION	IEC61162 Ed5
←	
Set output sentence version	

The NMEA version can be selected among NMEA 1.5 / NMEA 2.0 / NMEA 2.3 / IEC61162 Ed4 / IEC61162 Ed5.

APPENDIX I MENU TREE



APPENDIX II TECHNICAL SPECIFICATIONS

● GNSS EQUIPMENT

No	Item	Description
1	Receiving System	GPS, BDS, Glonass, Galileo
2	Rx signal	GPS L1C/A, L1C, L2C, L2P(Y), L5 GLONASS G1, G2, G3 BDS B1I, B2I, B3I, B1C, B2a, B2b Galileo E1, E5a, E5b, E6
3	Position Accuracy	less than 10m (GPS), less than 5m(DGPS), 95% of the time, horizontal dilution of precision (HDOP) ≤ 4
4	Tracking Velocity	999 kts
5	Position-fixing Time	Warm start: 30 seconds, Cold start: 45 seconds
6	Position Update Interval	1 second
7	RAIM Indicators	Safe, Unsafe, Caution, N/A, off
8	Route	Up to 30
9	Waypoint	Up to 999

● DISPLAY SECTION

No	Item	Description
1	Display	7 inch, color LCD, touch screen operation
2	Fix Mode	GPS, Glonass, BDS, Galileo or combined
3	Alerts	Loss of position and differential signals, HDOP > 4, Integrity status
4	Display Modes	Data, Plotter, Highway, Compass, Satellite
5	Track Plotter Display	0.02 to 320nm, 14 steps
6	Navigation Alarm	Arrival and Anchor Watch XTE, Speed
7	Satellite Information	Satellite number, Elevation, Signal level

● DGNSS BEACON (For DGNSS type)

No	Item	Description
1	Frequency	283.5 kHz to 325.0 kHz
2	Frequency separation	500 Hz
3	Bit rate	25, 50, 100, 200 bps
4	Operation mode	Auto, Manual, Scan

- **INPUT/OUTPUT DATA**

No	Item	Description
1	GNSS Output	NMEA0183, totally 3 ports, baud rate 4800 / 9600 / 19200 / 38400 bps
	Version	NMEA1.5, NMEA2.0, NMEA2.3, IEC61162 Ed4, IEC61162 Ed5
	Sentences	ALF, DTM, GBS, GNS, GGA, GSA, RMC, VTG, ZDA, etc.
2	Beacon In	RTCM 10402.4
3	BAM/Ins In	ACN, HBT
4	BAM/Ins Out	ALC, ALF, HBT, ARC

- **POWER SUPPLY**

DC 24V (range 12~36V), 0.4~0.5A

- **ENVIRONMENT CONDITION**

No	Item	Description
1	Ambient Temperature	Antenna Unit: -25°C to +70°C Display Unit: -15°C to +55°
2	Relative Humidity	95% at 40°C
3	IP Grade	Antenna Unit: IP66 Display Unit: IP22
4	Compass Safe Distance	Standard compass: 0.2m, Steering compass: 0.15m

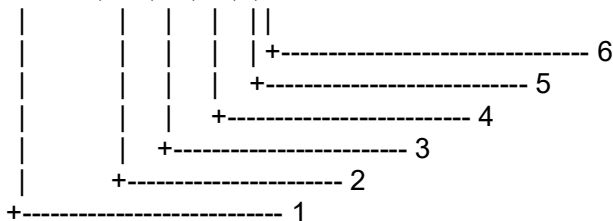
- **OTHERS**

No	Item	Description
1	Size	145 (H) x 264 (W) x 83 (D) mm
2	Weight	1.25kg (main unit)

APPENDIX III SENTENCE DESCRIPTION

ACN – Alert command

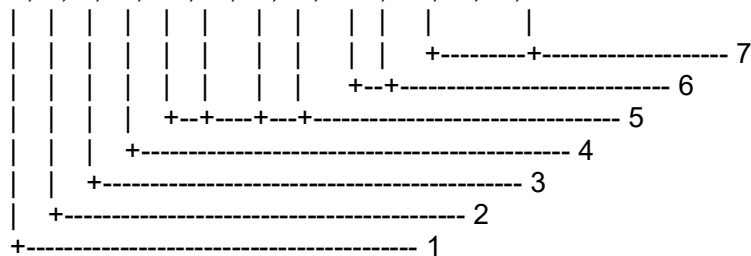
\$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh <CR><LF>



1. Time
2. Manufacturer's mnemonic code
3. Alert Identifier
4. Alert Instance, 1 to 999999
5. Alert command, A, Q, O or S
6. Sentence status flag

ALC - Cyclic alert list

\$--ALC,xx,xx,xx,x.x,aaa,x.x,x.x,x.x,.....,aaa,x.x,x.x,x.x*hh <CR><LF>

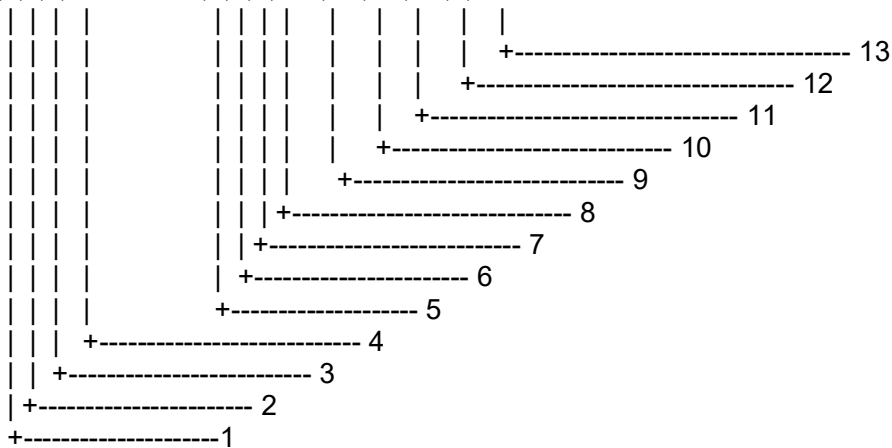


1. Total number of sentences for this message, 01 to 99
2. Sentence number, 01 to 99
3. Sequential message identifier, 00 to 99
4. Number of alert entries
5. Alert entry 1
6. Additional Alert entries
7. Alert entry n

Each entry identifies a certain alert with a certain state. It is not allowed that an alert entry is split between two ALC sentences.

ALF - Alert sentence

\$--ALF,x,x,x,hhmmss.ss,a,a,a,aaa,x.x,x.x,x,x,c---c*hh <CR><LF>

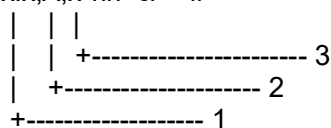


1. Total number of ALF sentences for this message, 1 to 2
2. Sentence number, 1 to 2
3. Sequential message identifier, 0 to 9
4. Time of last change, see NOTE A
5. Alert category, A, B or C
6. Alert priority, E, A, W or C
7. Alert state, A, S, N, O, U or V
8. Manufacturer's mnemonic code
9. Alert identifier
10. Alert instance, 0 to 999999
11. Revision counter, 1 to 99
12. Escalation counter, 0 to 9
13. Alert text

NOTE A: If the system time is out of sync with valid ZDA sentence, this field is NULL.

HBT – Heartbeat supervision sentence

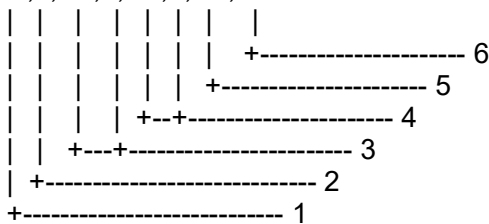
\$--HBT,x.x,A,x*hh<cr><lf>



1. Configured repeat interval
2. Equipment status
3. Sequential sentence identifier

DTM - Datum reference

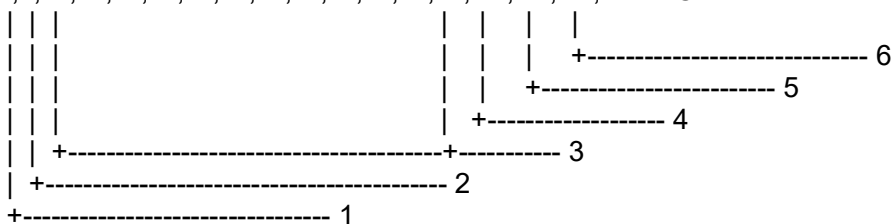
\$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>



1. Local datum WGS84 = W84
 WGS72 = W72
 SGS85 = S85
 PE90 = P90
 BDCS = C00
 User defined = 999
 IHO datum code
2. Local datum subdivision code
3. Lat offset, min, N/S
4. Lon offset, min, E/W
5. Altitude offset, m
6. Reference datum WGS84 = W84
 WGS72 = W72
 SGS85 = S85
 PE90 = P90
 BDCS = C00

GSA - GNSS DOP and active satellites

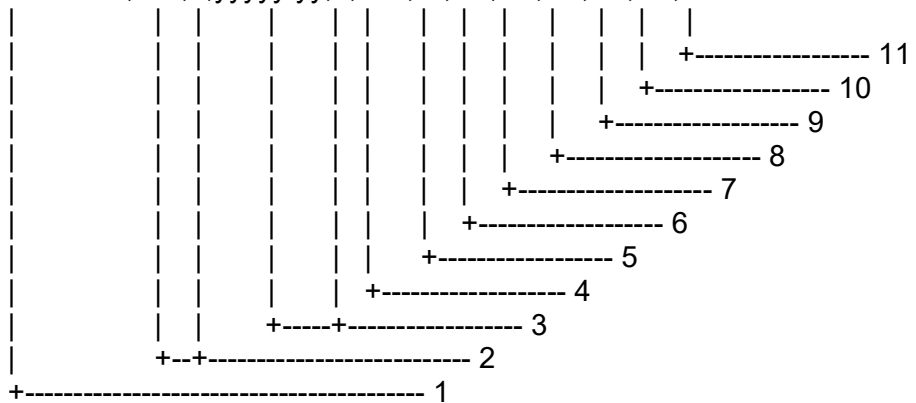
\$--GSA,a,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x,h*hh<CR><LF>



1. Mode: M = manual, forced to operate in 2D or 3D mode
 A = automatic, allowed to automatically switch 2D/3D
2. Mode: 1 = fix not available, 2 = 2D, 3 = 3D
3. ID numbers of satellites used in solution
4. PDOP
5. HDOP
6. VDOP

GNS - GNSS fix data

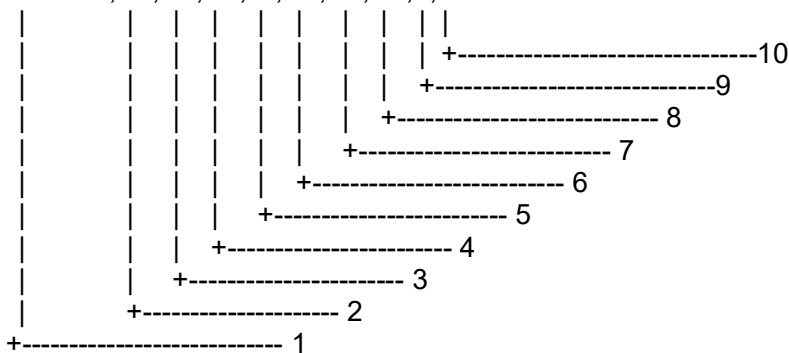
\$-- GNS, hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c,xx,x.x,x.x,x.x,x.x,x.x,x.x,a *hh<CR><LF>



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. Mode indicator
5. Total number of satellites in use, 00-99
6. HDOP
7. Antenna altitude, m, re: mean-sea-level (geoid)
8. Geoidal separation, m
9. Age of differential data
10. Differential reference station ID
11. Navigational status indicator

GBS - GNSS satellite fault detection

\$--GBS,hhmmss.ss,x.x,x.x,x.x,xx,x.x,x.x,x.x,h,h*hh <CR><LF>

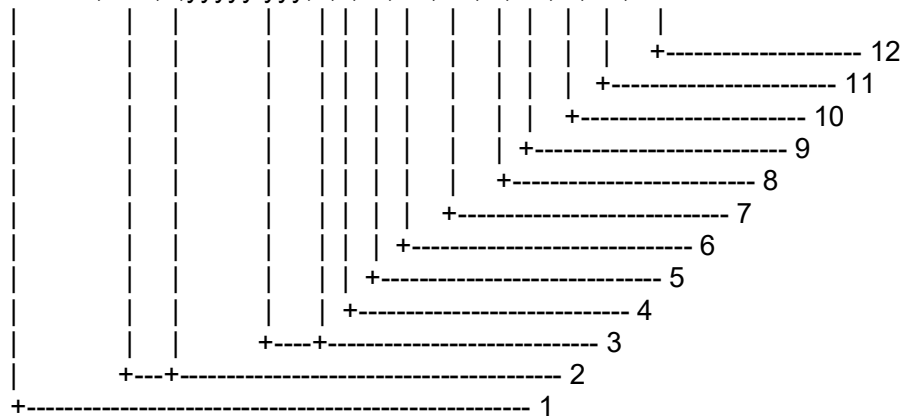


1. UTC time of the GGA or GNS fix associated with this sentence

2. Expected error in latitude
3. Expected error in longitude
4. Expected error in altitude
5. ID number of most likely failed satellite
6. Probability of missed detection for most likely failed satellite
7. Estimate of bias on most likely failed satellite
8. Standard deviation of bias estimate
9. GNSS System ID
10. GNSS Signal ID

GGA -Global positioning system (GPS) fix data

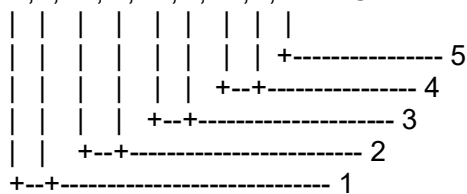
\$--GGA,hhmmss.ss,llll.lll,a,yyyyy.yyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. GPS quality indicator
5. Number of satellite in use,00-12, may be different from the number in view
6. Horizontal dilution of precision
7. Antenna altitude above/below
8. Unit of Antenna altitude, m
9. Geoidal separation
10. Unit of geoidal separation, m
11. Age of differential GPS data
12. Differential reference station ID, 0000-1023

VTG - Course over ground and ground speed

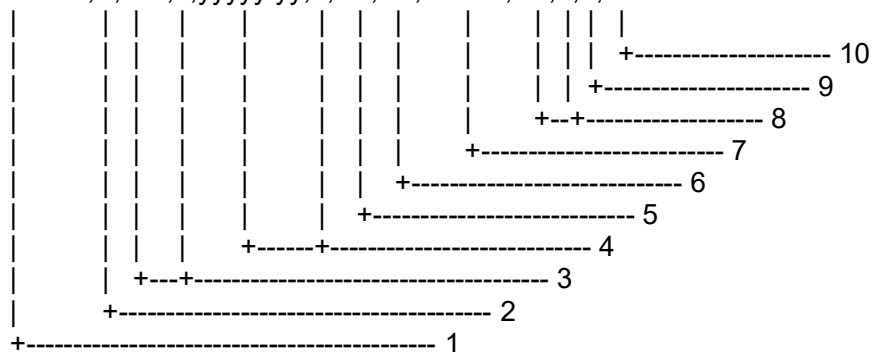
\$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>



1. Course over ground, degrees true
2. Course over ground, degrees magnetic
3. Speed over ground, knots
4. Speed over ground, km/h
5. Mode indicator

RMC- Recommended minimum specific GNSS data

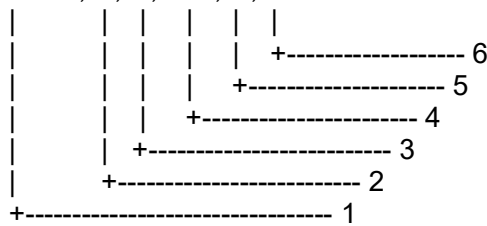
\$--RMC,hhmmss.ss,A,llll.ll,a,yyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a,a*hh<CR><LF>



1. UTC of position fix
2. Status: A=data valid, V=navigation receiver warning
3. Latitude, N/S
4. Longitude, E/W
5. Speed over ground, knots
6. Course over ground, degrees true
7. Date: dd/mm/yy
8. Magnetic variation, degrees E/W
9. Mode indicator
10. Navigational status

ZDA - Time and date

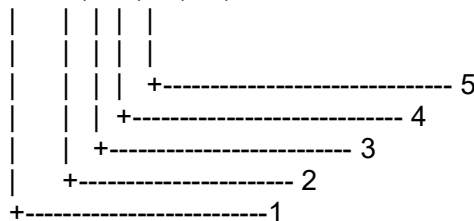
\$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx*hh<CR><LF>



1. UTC
2. Day, 01 to 31 (UTC)
3. Month, 01 to 12 (UTC)
4. Year (UTC)
5. Local zone hours, 00h to ±14h
6. Local zone minutes, 00 to +59

ARC - Alert command refused

\$--ARC,hhmmss.ss,aaa,x.x,x.x,c*hh <CR><LF>

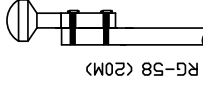


1. Time
2. Manufacturer's mnemonic code
3. Alert identifier
4. Alert instance, 1 to 999999
5. Refused alert command, A, Q,O or S

APPENDIX IV INSTALLATION DRAWING

Drawing No.	Description
NGR3000-ID-001	NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM
NGR3000-ID-002	NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM
NGR3000-ID-003	NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM (DGPS)
NGR3000-ID-004	NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM (DGPS)
NGR3000-ID-005	NGR-3000 MAIN UNIT SIZE DRAWING
NGR3000-ID-006	NGR-3000 MAIN UNIT MOUNT DRAWING (TABLE TYPE)
NGR3000-ID-007	NGR-3000 MAIN UNIT MOUNT DRAWING (FLUSH TYPE)
NGR3000-ID-008	NGA100 GNSS ANTENNA SIZE & MOUNTING DRAWING
NGR3000-ID-009	NDG-100 DGNSS BEACON SIZE & MOUNTING DRAWING

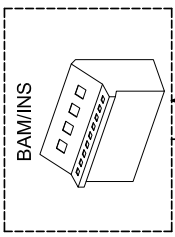
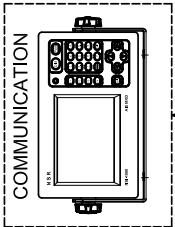
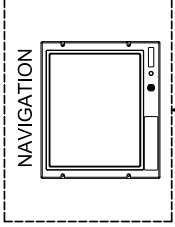
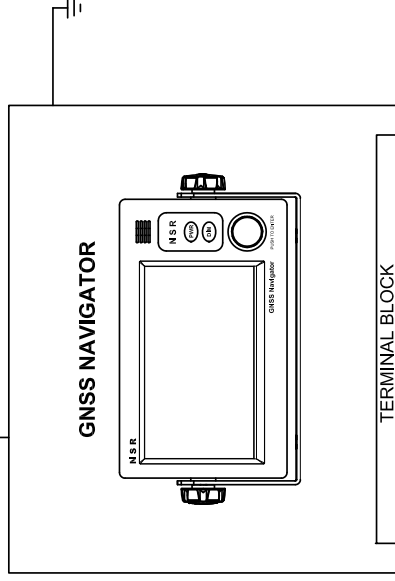
**NGA100
GNSS ANTENNA**



RG-58 (20M)

A, D, E

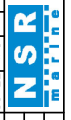
B, D, E



APPLICATION

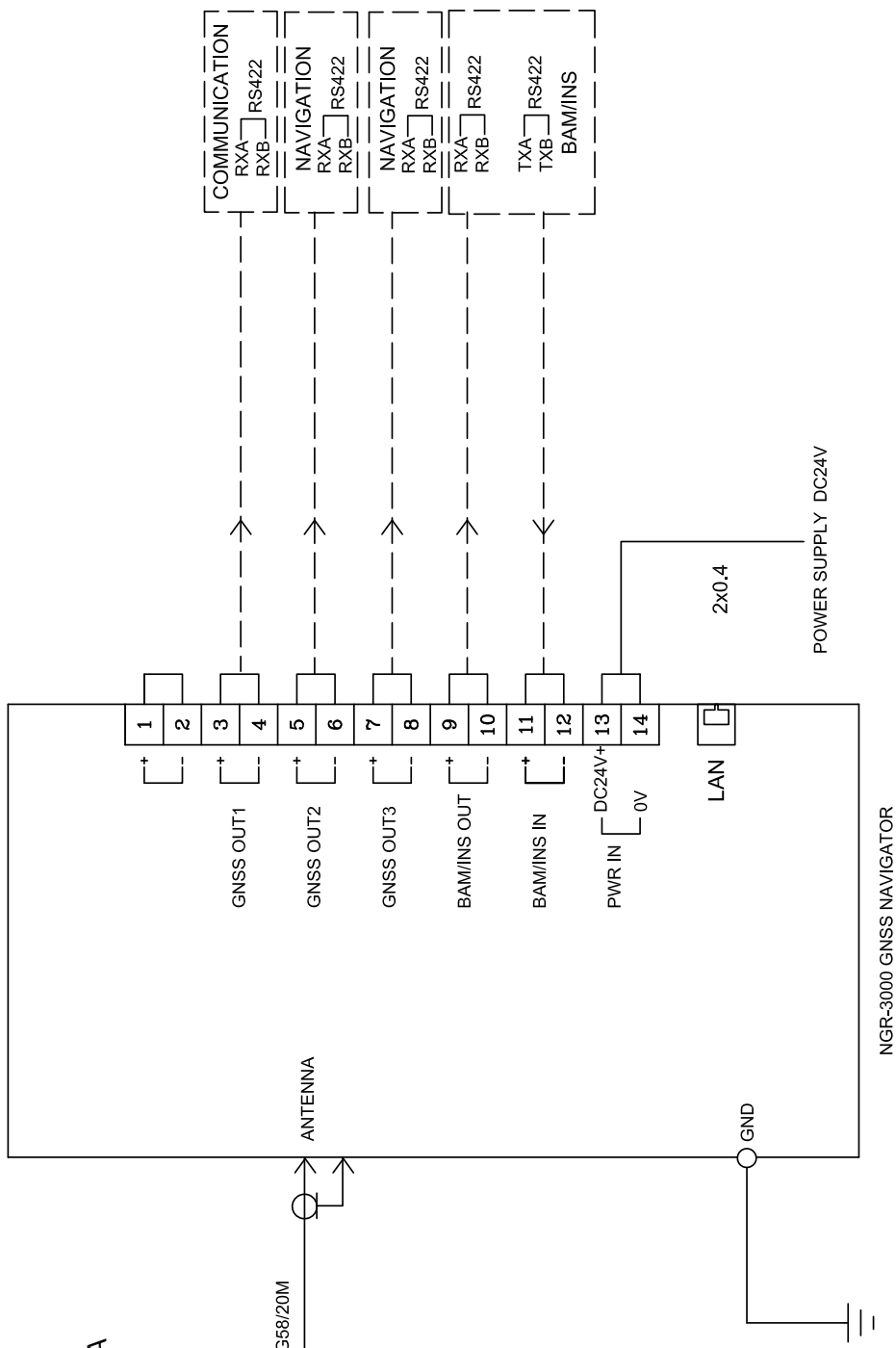
NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM

DATE	ITEM	NGR-3000	SIZE	A4
APPROVAL	SCALE	1/3	DATE	0000
CHECKED	DRAWING	NGR3000-ID-001	DATE	0000
DWG. NO.				



NEW SUNRISE CO., LTD.

NOTE : GNSS TYPE



NGA100 GNSS ANTENNA



RG58/20M

ANTENNA

GNSS OUT1

GNSS OUT2

GNSS OUT3

BAM/INS OUT

BAM/INS IN

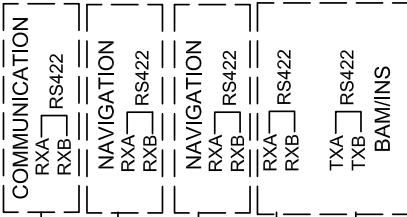
PWR IN DC24V+
0V

LAN

2x0.4

POWER SUPPLY DC24V

NGR-3000 GNSS NAVIGATOR



--- YARD SUPPLIED OR OPTIONAL

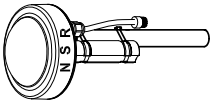
APPLICATION NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM

DATE	ITEM	NGR-3000	SIZE	A4
APPROVAL	SCALE	1/3	DATE	07/07
CHECKED	DRAWING			
DWG NO.	NGR3000-1D-002			

NSR NEW SUNRISE CO., LTD.

NOTE : GNSS TYPE

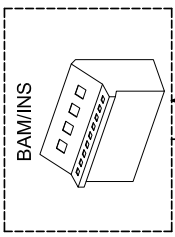
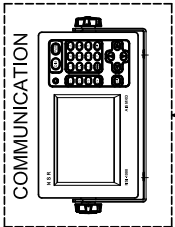
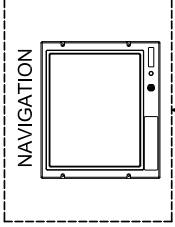
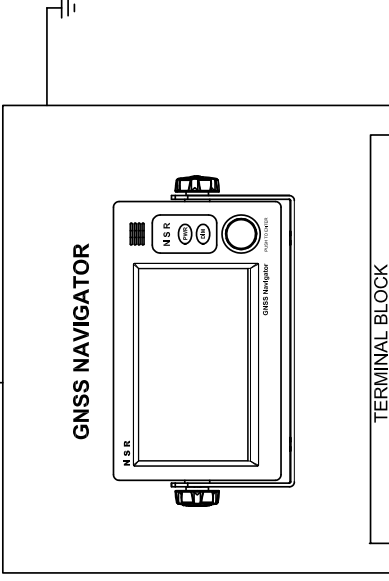
NDG-100
(NGA100)



SY-50-3/RG58

A. D. E

B. D. E



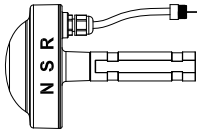
APPLICATION NGR-3000 GNS NAVIGATOR SYSTEM DIAGRAM

DATE	ITEM	NGR-3000	SIZE	A4
APPROVAL	SCALE	1/3	DATE	0000
CHECKED	DRAWING	NGR3000-ID-003	DATE	0000
DWG. NO.				

NSR NEW SUNRISE CO., LTD.

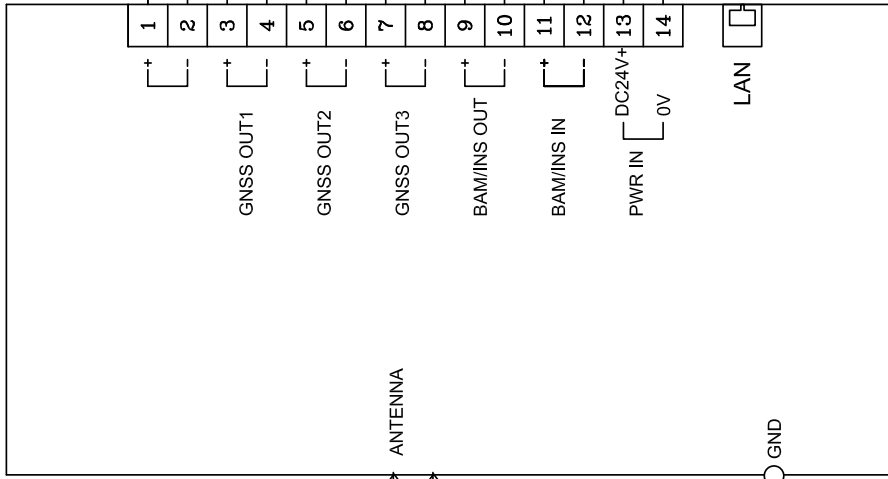
NOTE : DGNSS TYPE

NDG-100(NGA100)

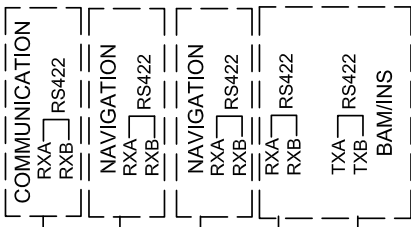


SY-50-3/RG58

ANTENNA



NGR-3000 GNSS NAVIGATOR



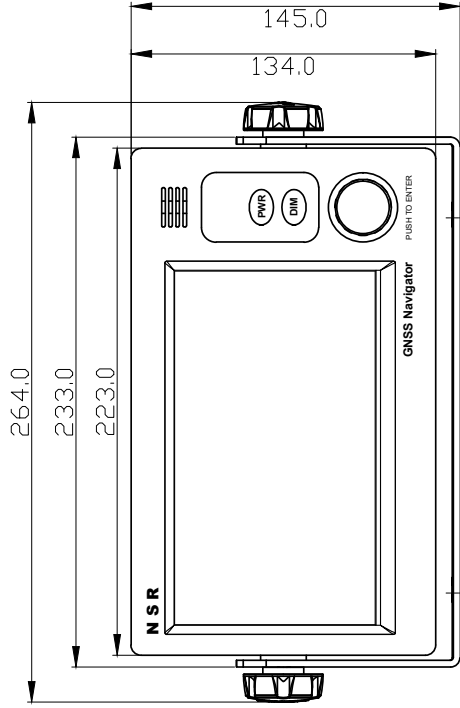
APPLICATION NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM

DATE	ITEM	NGR-3000	SIZE	A4
APPROVAL	SCALE	1/3	DATE	0000
CHECKED	DRAWING			
DWG. NO.	NGR3000-ID-004			

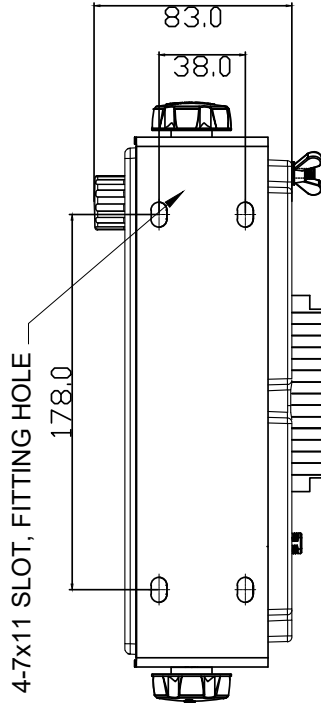
NOTE : DGNSS TYPE

--- YARD SUPPLIED OR OPTIONAL

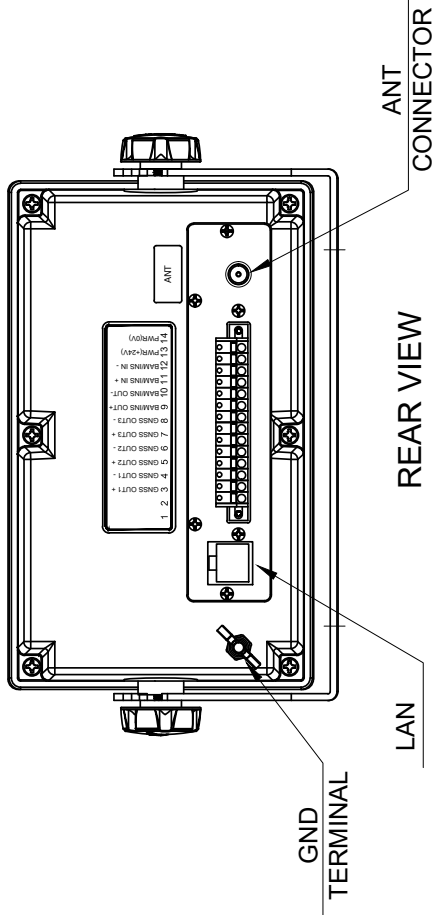
NSR NEW SUNRISE CO., LTD.



FRONT VIEW



BOTTOM VIEW



REAR VIEW

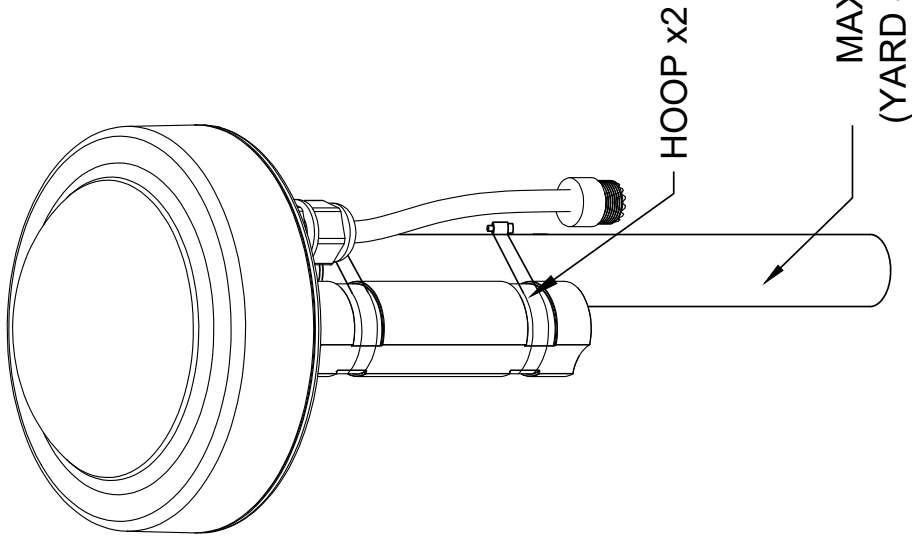
1	2	3	4	5	6	7	8	9	10	11	12	13	14
GNSS OUT1 +	GNSS OUT1 -	GNSS OUT2 +	GNSS OUT2 -	GNSS OUT3 +	GNSS OUT3 -	BAM/INS OUT+	BAM/INS OUT-	BAM/INS IN +	BAM/INS IN -	PWR(+24V)	PWR(0V)		

NO.	DATE	REVISION & DESCRIPTION	CHECKED	SIGNATURE

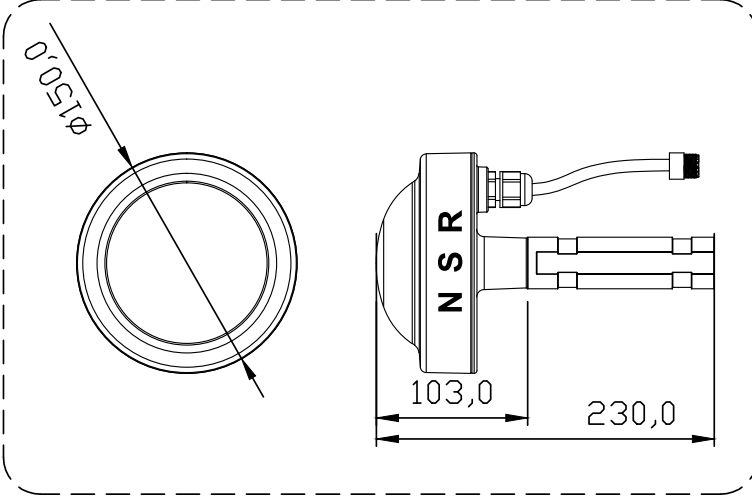
APPLICATION		NGR-3000 MAIN UNIT SIZE DRAWING	
DATE	ITER	NGR-3000	SIZE
APPROVAL	SCALE	1:1	DATE
CHECKED	DATE		
NAME	DATE		
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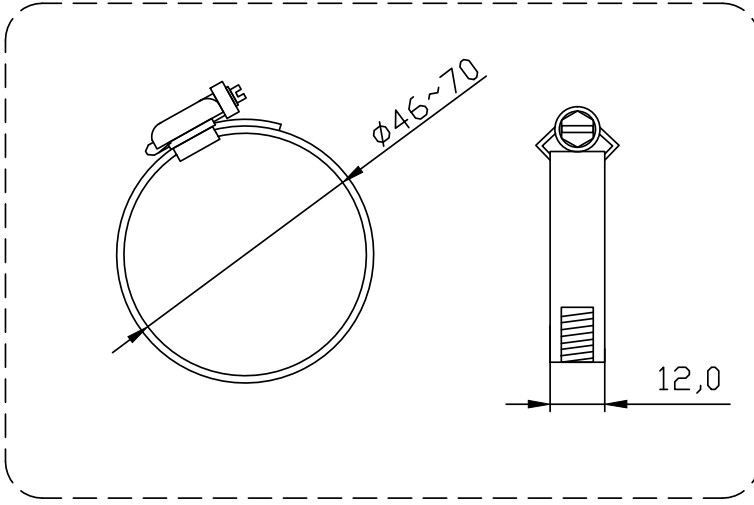
NDG-100
DGNSS ANTENNA



ANTENNA & MOUNT POLE



HOOP SIZE



NO.	DATE	REVISION & DESCRIPTION	CHECKED	DRAWING

APPLICATION: NDG-100 DGNSS ANTENNA SIZE&MOUNTING DRAWING

DATE	ITER	SCALE	UNIT	PROJ. NO.	DATE	SIZE	HA
APPROVAL	CHECKED	DRAWING	DATE				
				NSR NEW SUNRISE CO., LTD. NAGRS000-ID-008			

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September, 2025